DRAFT IV

NATIONAL PARKS AND NATURE CONSERVATION AUTHORITY

SUBMISSION ON THE HILL RIVER COAL MINE

AND POWER STATION PROJECT

CONTENTS

1. INTRODUCTION

The Mt Lesueur area has long been recognised as having outstanding nature conservation values as well as landscape values. The high floristic values have been recognized since James Drummond collected from this area in 1850. The 1962 Report of the Australian Academy of Science on national parks for Western Australia recommended preservation of the area. Again in 1974 this area received attention as a result of its conservation value when the Conservation Through Reserves Committee recommended that Crown land east and north of Mt Lesueur be added to the existing reserves which should as a whole be given Class "A" status for the purpose of Conservation of Flora and Fauna. This recommendation was accepted and endorsed by the Environmental Protection Authority and the State Cabinet on behalf of the Government.

Mineral tenement applications (for coal) over much of the proposed reserve were opposed in the Mining Warden's Court in 1982 and 1984 by the W.A. Wildlife Authority, the Conservator of Wildlife, the University of Western Australia, the W.A. Wildflower Society and the Conservation Council of W.A., on the principal grounds that mining would jeopardise the conservation values of the area.

In February 1988 the State Government released a new Policy on Exploration and Mining in National Parks and Nature Reserves. An important component of this Policy involved the establishment of a Task Force to accelerate the implementation and review of outstanding EPA Red Book recommendations.

The statement in the ERMP on this area (1.6.1) which draws the conclusion that the Government does not accept the need for conservation of the area because it did nothing about it in 14 years, is rejected by the Authority (similar inaction has been common on many "Red Book" recommendations accepted by the Government due mainly to delaying tactics inacted by mining interests).

Because of the acknowledged importance of this area for conservation, the Authority has decided to make its own assessment of the information available on its conservation values, and whether these are likely to be harmed by the proposed development as described in this ERMP. It will also comment on the landscape values and the impact of the development on these values.

The Authority has also decided to try to estimate the necessity for the project in the light of other existing information on energy resources and the communities predicted electricity needs.

2. IMPACT OF THE PROPOSED DEVELOPMENT ON THE LANDSCAPE VALUES

The area in the vicinity of Mt Lesueur has long been recognised by the University for its Education and Recreation values (including Tourism). Considerable research by the Botany Department as well a student excursions and projects have been based upon this area.

Of the 800 odd species of plants making up the individual vegetation complexes and thus the character of the Lesueur area, 100 of these species do not occur outside this area. Nor is there anywhere else a landscape similar to this, with its beautiful break-aways and flat topped, steep sided mesas of individual character and charm, which are in direct contrast to the surrounding gently undulating Kwongan sand plain.

Mt Lesueur itself is 100-150m above Munbinea creek, whereas the normal land surface in this vicinity is only of 50-80 metre relief. The rugged uplands of this area, which are separated by north/south trending fault lines, display a variety of interbedded rock types, leading to a complex differentiation of soils, which in turn support an intricate mosaic of vegetation communities and thus a wide variety of species. As early as 1850 James Drummond (a botanical collector) became aware, in the course of his work, of the exceptional diversity of this area.

It is significant that, viewed from the fault line look-out (tourist stop five - which is a favourite vista spot), the mountain known as the Notch will be completely replace and the valley filled to 260-280 metres in height with a spoil dump. Also from a visual point of view, current Landsat imagery and aerial photos of this area show cleared farm land to the north and east of the project. The depiction in the ERMP of the whole development on out of date (uncleared) background maps gives the impression of there being "lots of bush land" quite a deal of which no longer exists. (See also Section 3.)

The Hill River ERMP:

- does not address the potential deleterious impacts of the project upon the terrain and thus the landscape quality of the area and its associated value to people, who, from University students to tourists, currently hold this area in very high regard.

- does not assess the impact of the project upon the country side when viewed from the air.

- nor does it consider the unsightly impact of the changed skylines within the view-sheds, from vantage points within the proposed Mt Lesueur Park.

. or the actual visually polluted oblique angle impacts gained from adjacent roads.

Note: The depictions of these impacts in Plates 3 to 7, show great discrepancies, of the position of the spoil dumps illustrated in Appendices B-F, Figure 1. For instance:

. Plate 3 indicates the southern dump to be located on a much closer hill (about seven kilometres away) than is the illustration position of about 15km distance, extending along the skyline, i.e. it is depicted as being situated on a hill in the proposed Coomalo National Park. Also the stack (illustrated as prominent), would actually be obscured (behind the adjacent ridge to the north).

. On Plate 4 the impact has been removed from the skyline and greatly diminished in size. The illustration photographed from this angle actually should depict two overlapping dumps located on and 20 metres higher (260-280 metres) than the skyline, in the south stretching from about 5mm further south than the extent of the present depiction of the dump, right along the skyline to the north of the indicated stack (which is depicted somewhat to the south of its actual location). In the northern portion, this dump will be slightly lower than the present skyline, (i.e. 302-280 metres) until its northern most extremity, when it is once again higher than the skyline.

. Plate 5

- the southern dump extends further north than is illustrated, almost to the notch on the horizon (which is the southern slope of Mt Michaud), and it is also about 20 metres higher than is depicted.

- The second of the southern dumps will be in front of Mt Michaud extending on the photograph from about 7mm to the right of the notch until about 3mm past the beginning of the already depicted northern dump.

- the northern dump as depicted, is completely in the wrong place. It is on a hill quite a bit to the south of its given location whereas actually it should stretch to the right of the road, considerably higher than the present skyline and extending north past the limit of the edge of the photograph. This will be the most conspicuous of the dumps, in fact the two northern dumps will become much more obtrusive to travellers as they pass along the Coorow Greenhead Road.

- Plate 7 - the southern dump is actually to the north of the stack from this viewpoint and would thus be obscured by the hill in the foreground.

Equally misleading as the above misrepresentations is the fragmentation of information and disjointed details depicted on the figures in the text, which give a completely false impression of the extent of the impact of this project, for example:

- Fig 4.11 and 4.12 "Catchment Areas" show only pits and a location of the power station.

- Fig 4.17b "Vegetation" only shows an outline of the power station.

- Fig 4.20 "Location of Apiary Sites" only shows pits and an outline of the power station.

So that in considering the project's impact on any of these above elements, one does not get a sense of the scale and area of disturbance involved, i.e. of the additional impacts caused by ancillary infrastructures such as the overburdened dumps, the sedimentation ponds, the construction of the surface drainage control systems (mentioned in the Summary document page 25), development of the bore fields, each with its individual clearance zone, access roads, haul roads, service tracks and service corridors for telephone, power and water, as well as waste water disposal pipelines.

This report also ignores the aesthetic impact of the coal mine with pits 100-150 feet deep, the excavation of which will have the additional affect of de-watering and/or depressing the water table in the surrounding impact areas, with unknown deleterious effects upon the vegetation. Also the visual impact of the power station super-structure and any ancillary working constructions such as storage dumps, office/site buildings etc., are not assessed.

The very large area of pits (4 to be opened at once), each with a pit-life of 20-30 years, is also of concern from many points of view;

- the visual impact

- development of erosion

- generation of dust

- problem of rehabilitation (the successive decrease in usefulness of top soil as a source of propagules, when stockpiles for any length of time), which means that, at a maximum, fresh topsoil will only be able to be put back on less than half of the area. This will greatly decrease the possibility of successful rehabilitation by this method, resulting in the perpetuation of visual scarring unless alternative strategies are implemented.

3. IMPACT OF THE PROPOSED DEVELOPMENT ON BIOLOGICAL RESOURCES

The NPNCA believes that the disjointed details of the proposed development provided on **Figs. 5.1, 5.8 and 7.4** are misleading in that there is no representation of the composite extent of predicted disturbance. The NPNCA believes that the review of potential impacts of the development on the biological resources as well as the landscape values is impeded by the lack of composite information in the ERMP.

- The importance of the delineation of the impact area is reflected in an assessment of the potential impact on the gazetted rare flora species and vulnerable flora species, where the differences between the areas involved with "minimal" and "maximum" impacts (Burbidge, Hopper and Van Leeuwen, 1990) becomes a major factor in determining the influence of the proposal on the rare and vulnerable native flora species.

- The alternative option of locating the Power Station on nearby cleared land does appear to have been addressed. The latter would reduce to some degree the level of impact on the biological values of the Lesueur area.

- Another misleading aspect of the depiction of the degree of impacts on biological resources relates to the baseline information presented on most figures in the ERMP text (e.g. **Figure 1.2**) where the majority of the region is coloured in darker green shading. As there is no key or legend the reader assumes that this colouring relates to uncleared areas. On reviewing a recent Landsat Imagery (Hill River, 1:100,000, 1988) the pattern of colouration on the figures in the ERMP are completely misleading as the majority of the area outside the proposed Reserves and National Parks is cleared for agricultural and pastoral pursuits.

In the summary of the ERMP (**Section 4.**, pp 16 and 18) it is stated that there are "numerous reserves and National Parks, both existing and proposed in the region". This later statement refers to **Figure 8a** in the Summary (pages 20 and 21). This figure is also misleading in its presentation, as it includes many reserves with a wide range of purposes and vesting. Further, the tabulation does not include reference to the differences or similarities in plant species, plant communities, fauna species or faunal assemblages which are represented on the respective conservation reserves and National Parks. Where as this type of detailed review for the various biological components has been carried out in previous ERMP documents (for example the ERMP for the Gnangara Mound on the northern Swan Coastal Plain) it appears to be lacking for the recognised biologically significant areas which would be impacted by the proposed project. Also in this context, it is of note that the large reserves, along the coastline, to the north-west of the Project, although geographically quite close, support a quite different range of plant communities and faunal habitats.

In reviewing the potential impact of the project in a regional context, the ERMP includes information in (**Figure 4.15, Table 4.5(a) and Table 4.5(b)**) indicating the number of reserves. The presentation of all these reserves is misleading as in the case of many of these reserves:

- the purpose of all reserves is not for the conservation of flora and fauna, some are for non-conservation purposes such as:
  - timber
  - gravel pit
  - public recreation
  - water and camping
  - educational purposes
  - stopping place for travellers
  - government requirements
  - horse breeding
  - abattoir and holding paddocks
  - rubbish disposal
  - public utility etc.

- the underlying geology, topography, soils, landforms, hydrology and vegetation systems is different on many of the reserves.

- the security of tenure for many of the reserves is questionable in view of the lack of vesting.

3.1 Impact on the Vegetation

In the summary of the existing environment (**page iii**) the statement "It has been concluded that the most common vegetation types in the Project area are also widely distributed in the region" does not reflect the obvious complexity of the results collected regarding the vegetation. For example:-

- The potential impact of the development on the vegetation is evident from a review of the location of the project area in relation to the Geology (**Section 4.1.2 and Figures 4.2 & 4.3**), the Topography and Geomorphology (**Section 4.1.3, Figure 4.7**), the Soils (**Section 4.1.4, Figure 4.8**), the Hydrogeology (**4.1.5**) the Surface Hydrology (**Section 4.1.6, Figure 4.11 and 4.12**) each of which illustrates the extreme background complexity of the Lesueur area. The proposed project spans the boundaries of diverse underlying elements and superficially overlaps a range of soils and catchment areas which is recognized as being critical in the complex delineation of the vegetation of the area.

- (**page v**) of the document states that the "clearing will take place within one Vegetation System (the Gairdner System), and 1,850ha represents 4.6% of the Gairdner System in the Hill River area". No direct reference is made to the degree of clearing which has already taken place within the Gairdner Vegetation System nor the fact that this project extends into the Lesueur Vegetation System (**Figure 4.14**).

Therefore the statement that the "most common vegetation types in the Project area are also widely distributed in the region" (**Summary, page 16**) is extremely misleading. It avoids all reference to the above interactive complexity of the vegetation, landforms, soils, topography, geology and hydrogeology which results in the exceptionally high species diversity of the area.

To fully assess the impacts, the Authority considers that it is necessary to review the impact of the project at the detailed level of botanical studies achieved by Hnatiuk and Hopkins (1981), Griffin et al. (1983), Froend (1987), Martinick & Associates (1988a and b) and Griffin and Keighery (1989); not at the superficial level presented in the ERMP.

The confusion over the terminology used relating to the levels of vegetation definition is also misleading, as is illustrated in the following Figure.

LEVELS OF VEGETATION DEFINITION

KWONGAN VEGETATION (Beard, 1976a)

3 Landform-Vegetation Systems
with Vegetation comparable to that
of the Project Area (Beard, 1976b, 1979)

GARDNER LESUEUR TATHRA

(Figure 4.14)

Review of Hnatiuk and Hopkins (1981)
Griffin et al. (1983) & Froend (1987)

Differences in 3 Landform-Vegetation Systems

on local scale
7 Landform-Vegetation Categories
(ERMP Table 4.6, 4.17a, 4.17b,4.17c)

50* Vegetation Units (Types and Sub-Types)
Defined & Mapped
(Section 4.2.4, Table 4.6)

Note: * Differs from 54 Vegetation Units in Martinick & Associates, (1989c)

Reference to the degree of impact on the 7 landform-vegetation Categories is defined in **Table 13.2** (Burbidge, Hopper and Van Leeuwen, 1990) as based on Martinick & Associates (1989c). No such level of local and regional assessment was carried out in the ERMP on the 50 (or 54?) vegetation units (types and sub-types) present for this area. Yet this review is critical to the accurate assessment of conservation values of the vegetation of the project area.

Therefore the Authority considers that the ERMP has ignored the intrinsic conservation values of the component plant communities as it only considers the "vegetation system" and "landform-vegetation category" levels and does not deal with the effect upon the 50 (54?) individual vegetation units.

3.2 Impact on the Flora

As early as 1850 James Drummond recognized the exceptional floristic values of the Mt. Lesueur area. The Authority recognises the attention drawn by scientists and botanists since 1850 to the significant floristic values of the Mt Lesueur area, and that it still has not received reservation status despite this recognition by scientists and the repeated recommendations for reservation for these values.

In addition to the large range of rare, endemic, vulnerable and geographically restricted species present, the other significant value of the Lesueur area is the great diversity of species, indicated by the presence of 821 species, which represents approximately 10% of the vascular plant species of Western Australia represented in the local vicinity of Mt Lesueur. The ERMP does not appear to recognize the full significance of the floristic and phytogeographical values of this area and tends to simplify these values by restricting summary comments to rare and poorly known species rather than dealing with the wider values which also include the floristic diversity and the phytogeographical features (includes southern and northern extensions of species), as well as the range of flora species not recorded to any extent in nearby conservation Reserves and National Parks. Therefore the Authority considers that the general comments regarding the flora ignor pertinent critical conservation issues.

3.3 Impact on Gazetted Rare and Vulnerable Plant Species

In assessing the potential impact of a proposal on the biological resources, the level of available background information is critical. In a floristically diverse area such as Mt Lesueur, it is well recognized that there are currently many gaps in information about the rare, vulnerable, geographically restricted, endemic, and even the widespread flora species. Nevertheless on the basis of the potential impact of the proposed development on the seven gazetted rare flora alone it then becomes a question of what society considers acceptable in terms of levels of impact. In addition, until the degree of impact ("minimum" versus "maximum") is defined, a full assessment of the implications for conservation of these species cannot be determined.

The Authority also noted that the levels of impact quoted in **Sections 4.2.1.5 and 6.2.2** on gazetted rare plants and vulnerable species differs from the assessment of Burbidge, Hopper and Van Leeuwen (1990). These differences relate to:

. the degree of impact and potential disturbance areas (the ERMP tends to refer in **Section 6.2.2** to the "minimum" degree of impact rather than the "maximum" impact).

. the definition of "vulnerable" species differs (48 vulnerable species are acknowledged by the ERMP in 4.2.1.5; while the summaries in Burbidge, Hopper and Van Leeuwen, 1990 are much wider and more comprehensive).

In the summary by Burbidge, Hopper and Van Leeuwen (1990) it is recognized that:

- 2/3rd of the 111 regional endemics would have populations destroyed should mining affect the "maximum" area,
- 9 taxa (of these 111 regional endemics) are restricted to the proposed Lesueur National Park. Further studies are required before the impacts of the proposed mine upon these can be fully assessed.
- 26 very geographically restricted taxa (with a maximum range of 50km) occur within the proposed mining impact zone. 20 of these 26 are not known on current conservation reserves.
- 81 species occur at the northern and southern limit of their distribution within the proposed national park. Of these 45 would be affected within the area of maximum impact of the proposed mine. 10 are not found elsewhere in the proposed Park.

Although the proposal recognized the significance of the gazetted rare species, the Authority considered that the ERMP does not address the other key floristic issues associated with the endemic species, the geographically restricted species, the vulnerable species or the phytogeographically significant species. Therefore on the basis of the flora sections alone there are a lot of conservation issues not addressed in the ERMP which are significant to conservation of flora species in this State.

3.4 Impact on the Fauna

The ERMP recognizes that Fauna communities are dependent on the vegetation and soil types, however no local or regional significance of the faunal assemblages in relation to habitats is reviewed in the text. The ERMP section on fauna (**4.2.2**) does not recognize the range of significant interactions between specific flora and fauna species, with the exception of reference to the White Tailed Black Cockatoo (**Appendix C**) and Long-billed Corella (**Section 4.2.2.2**).

The ERMP states that there is a low level of structural diversity in the vegetation, and implies that this reduces the number of different fauna habitats which are available. It does not include reference to the importance to a variety of avifauna and mammal species of the diversity of flowering heath species, which are available at different times of the year. Also the variety of insectivorous and nectivorous species of this area is well recognized, but the ERMP does not address the significance of any of these interactions.

The information provided in the ERMP makes it difficult to assess the potential impact ("minimum" and "maximum" levels) of the proposed development on the vertebrate or invertebrate fauna at a local and/or regional level, particularly as detailed methods and results for faunal studies by Martinick & Associates are not presented as Appendices.

Statements in **Section 4.2.2.1** such as:
"For the Hill River Project such studies would be impossible without many years of work, and basically would achieve very little because:

- findings in any invertebrate group would not necessarily reflect what is happening with any other group;
- there are no comparative data with which to correlate results; and
- the findings would have no real implications for management except in the most unusual circumstances."

reflect a lack of understanding regarding habitat integrity and health.

In contrast, from information currently available (Burbidge, Hopper and Van Leeuwen, 1990) it is recognized that the proposed Lesueur National Park has:

- More mammal species than most reserves in the south-west, and is only surpassed by 3 other areas managed for conservation, namely: Dryandra, Dragon Rocks and Fitzgerald National Park.
- More bird species than most reserves in the south-west, and is only surpassed by 2 other areas managed for conservation, namely: Kalbarri and Fitzgerald National Parks.
- More reptiles than most reserves in the south-west, and is only surpassed by Kalbarri National Park.

The Lesueur area is also important as it contains a range of mammal species which are dependent on coastal sandplain and heath. These are threatened by urban, industrial and agricultural developments further south. The significance of these developments on the declining native fauna has been highlighted in studies such as Chapman et al. (1977) at Cockleshell Gully, How (1978) on the northern Swan Coastal Plain and Kitchener (1978) on the northern Swan Coastal Plain.

Therefore the Authority considers that the ERMP document lacks information on the vital wider issues regarding the conservation of fauna. Further, that the lack of data on vertebrate and invertebrate species does not necessarily imply that there is lack of potential impact; both directly on the fauna species and indirectly through the alteration or removal of essential habitats, nesting and feeding resources.

Section 6.3.1 (Page 6-7) does not review or assess the potential impact of noise from the proposed operation on the faunal communities.

Section 8.4.1 (Page 8-23) does not mention faunal hazard control on the sedimentation/evaporation ponds. In view of its proximity to salt lakes, the Indian Ocean coastline and the north-south migratory route for many bird species, the importance of these ponds on the avifauna should have been addressed in the ERMP. This proposal has implications for the international agreements of China-Australia (Canba) and Japan-Australia Migratory Birds Agreements.

Section 8.4.2 (Page 8-24) does not mention the potential effects of the worst case scenario of pipeline leakage of the waste water upon local faunal populations in the area, (potential for leakage relates primarily to the proximity of the Warradarge Fault and the pipeline crossing across the Hill River).

The four gazetted rare fauna species which are present or likely to be present are summarized, but no detailed information is provided on the degree of potential impact which the proposal may have on these populations.

The Authority considers that there is inadequate data presented and no reasons interpreted to reach the conclusions which are given in **Section 6.3.1.** that:

. "None of the Gazetted Rare species presented in **Section 4.2.2.4** will be significantly affected by the Project"

. "Vegetation, flora, fauna and habitat studies in the Project area, have not provided any evidence that there are restricted habitats or any faunal species which could be endangered by the Project. <u>It must therefore be concluded that the Project will not have major detrimental impacts on the fauna".</u>

Also that the aquatic fauna, marine fauna and the indirect effects of lighting upon fauna are considered to be important, but these issues have not been reviewed in this submission.

3.5 Impact of Gaseous Emissions on the Biological Resources

In reviewing the potential effects of gaseous emissions on the biological values, the ERMP relies heavily on previous studies rather than studies which deal with the local native species. The Authority is concerned about the lack of specific information on the effects of both sulphur dioxide and other gaseous and particulate emissions on the local native species. For example, comparisons with studies at Kalgoorlie are misleading as the climate and plants species are totally different. A summary of the current studies under way (**Section 8.2.8.3**) should be included in the ERMP document to enable an assessment of potential impacts of sulphur dioxide on the native species.

The information to reach the summary comment (**Summary - page v**) that: "Based on the modelling results to date, it is predicted that groundlevel concentrations of the principal atmospheric emissions (sulphur dioxide, nitrogen oxides and particulate matter) will not result in adverse environmental impacts" appears to be an over-simplification of the potential impacts, considering detailed data on the potential effects of these gases is not provided for the range of native species in the Lesueur area. As indicated in **Section 8.2.8.3**, of the 128 species reported and tested in previous published studies, the only one to occur in the Hill River or Lesueur area is a variety of *Eucalyptus calophylla* (**Page 8-10**). Consequently the current studies mentioned on **Page 8-11** become critical in assessing the potential effects even at a life-form or leaf-form level.

In summary, the Authority considers that there is no evidence to validate the general conclusion in the summary that the emissions will not result in adverse environmental impacts.

4. OTHER POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

In assessing the potential impact of the proposed Hill River Project, the depictions of the scattered ore bodies and the Power Station as illustrated in the **Summary Report - on Figures 8a and 8b (Pages 21 to 23)** and on **Figure 15 (page 37 of Section 7 of the Summary Report)** give no indication of the associated disturbances such as the haul roads, the treatment plant, access routes, transport corridors or waste dumps. Further to these, there is nowhere a presentation of the summation of disturbance areas.

In **Section 5 of the Summary (Page 25-27)** the need for these latter associated facilities are mentioned without clear definition of location or assessment of the degree of impact. For example, in **Section 5 of the Summary (Page 26)** and **Section 8 of the Summary (Page 45)** the dump

design is discussed, but no location details are provided in relation to the location of sensitive biological areas. The areas involved are discussed in **Section 7 of the Summary (Page 33)** but again no detailed locations are provided. Aesthetic impacts of the Dumps, Power Station and Stack have been discussed in the Landscape Section.

4.1 Dieback Disease

In the summary section of the ERMP text (**page vii**) the important subject of *Phytophthora* spread and infection is dealt with by the cursory statement:

> "Other Impacts. Less significant potential impacts and their management include:.....
> . Dieback Disease"

Followed by:

> "The potential for the introduction and dispersal of dieback to the Project area will be managed by the implementation of stringent hygiene measures".

Although to date only two infestations of *Phytophthora citricola* have been recognized in the area (**Section 6.2.3**), the Authority is aware of the potential for widescale effects from *Phytophthora* spp. on many of the species growing in the proposed Lesueur National Park. In an area which is recognised for the high diversity of its flora, the range of its rare and vulnerable flora species, the large number of local endemics present and the phytogeographical significance of range extensions to a number of species, any such risk of infection and the spread of disease is quite significant.

The Authority considers that no risks should be taken in exposing the biological values to either the chance of infection or to disease spread, as one of the prime values of this area for reservation is the current health of the species and the lack of the dieback disease (*Phytophthora cinnamomi*) in this area.

4.2 Groundwater Extraction/Supply

The Authority is concerned regarding the potential impacts of the proposed water extraction both from near the mine and also from the wider area, as a requirement for the Power Station. The ERMP does not clearly define the degree of the potential impact on the local catchments and sub-catchments (**Figures 4.11 and 4.12**) near the proposed project, or on areas in the vicinity of the proposed borefields (**Figure 7.6**). These overlap both current and proposed Reserves and National Parks, (for example the biologically sensitive species in the areas of

the proposed Coomalo Reserve (**Figure 4.15**), which the depicted borefield traverses, and in particular the Bitter Springs area.

In **Section 8.3.2**, (P8-20) the comment:
"Experience elsewhere supports the conclusion that native plant species which depend upon soil moisture in the unsaturated zone will not suffer as a result of borefield extraction" is a general statement, which is not substantiated by any proof or references. This conclusion in fact appears to ignore the potential of many native species to be dependent on particular ranges of soil moisture conditions which may be either directly or indirectly affected by changes in water table and local soil moisture levels, Heddle (1980) and Dodd et al. (1984). Note in particular the effect upon the water dependent *Melaleuca rhaphiophylla* forest, also *Eucalyptus rudis*, and upon species in general near cone depressions associated with water extraction.

In **Section 8.3.2**, the proponents suggest that localized perched and regional unconfined aquifers, which occur at shallow depth in the area and support native phreatophytic vegetation, will not be used as sources of water". In contradiction to this, the proponents then suggest that there may be a potential problem (on pages **8-21 and 8-22**) requiring "Regular monitoring" which "will identify any adverse trends before unacceptable impact on the vegetation and fauna occurs". The possible effects of changes in local hydrological conditions affecting aquatic fauna (**Section 8.3.3**) are also summarized.

The Authority considers that this section on one hand is denying the potential for the impact from the groundwater extraction for the Power Station and coal mining operation, but on the other hand is recognising its effect (in the need to monitor potential "adverse trends"). In addition the problem with the latter suggestion is that by the time any indications of adverse effects are able to be detected, irreversible changes to the vegetation will have occurred.

The hydrological section in the ERMP raises a series of serious questions which relate to the potential direct and indirect impacts of the outlined proposal, upon the biological resources of the Lesueur area and adjacent current and proposed reserves and national parks.

These impacts are not just confined to the potential detrimental influences of the extraction of water, but also include unconsidered impacts from the development of the borefields, such as roads, access tracks, clearing for facility infrastructures, storage, sedimentation ponds, waste-water pipelines and marine discharge.

5. REHABILITATION

In broad principles, the Authority is concerned that the proponent has not provided any clear definition of the areas needing to be rehabilitated, either associated with the coal mining operation or to do with the proposed power station and the associated infrastructures, e.g. the transport corridors (including roads, haul roads, access and service tracks), surface drainage control systems (**Summary Section P25**), pipelines, clearing near bore-holes, power-line easements etc.). Nor do they provide credible proof of their ability to achieve acceptable rehabilitation results in an area of such diverse speciation, topography, geomorphology, hydrology and soils.

In addition the ERMP does not address the rehabilitation of impacts on other sensitive conservation areas such as current and proposed reserves and national parks beyond the boundaries of the proposed Lesueur National Park. The Authority considers that further definition of these potential areas are critical in any assessment of the impact of the proposed coal mine and power station on both a local and a regional scale.

The extent,type and location of the final overburden dumps and the sedimentation ponds appear to require further definition in the ERMP, particularly in view of the variation in "minimum" and "maximum" potential impact levels on the flora and fauna species in the Lesueur region (Burbidge, Hopper and Van Leeuwen, 1990).

The feasibility of rehabilitating the reconstructed dumps and disturbed areas to support and maintain native vegetation has not been demonstrated. In light of current knowledge, the Lesueur area presents a much more complex picture than has yet been attempted. In view of the differences in underlying geology, topography, soils and the diversity of the Lesueur vegetation, the Authority questions the appropriateness of comments relating to rehabilitation of areas such as Enneaba sandplains! Prescriptions to reconstruct ecosystems require comprehensive information regarding such questions as:

- propagules supply
- optimal propagation processes
- life history characteristics
- presence of other inter-reactive organisms (such as mycorrhizal fungi, nitrogens fixing bacteria and pathogens present.
- hydrological regimes in the reconstructed substrate
- nutrient cycling processes
- Seed characteristics such as germination dormancy, specific necessary pre-treatment, longevity etc.
- the influence of underlying sediments as well as the topsoil/sand/laterite) upon the establishment and health of the flora.

It is also pertinent to assess the feasibility of obtaining topsoil for rehabilitation purposes from areas such as limestone pavements and boulder strewn hillsides, much less the capacity for rehabilitation to pre-existing native vegetation. This question also applies to bulldust clayey areas for which to date there has been no satisfactory rehabilitation demonstrated.

Of particular concern is the following option which was mentioned or referred to in several sections of the ERMP text (**Summary - page 26; Sections 5.2.5, 5.13**) that:
"While the currently proposed land use at the completion of mining is to rehabilitate disturbed areas to native local vegetation, options will be reviewed during the life of the Project in conjunction with the relevant authorities".

As the NPNCA has a specific role in both managing Nature Reserves and National Parks, as well as the conservation of the native flora and fauna in Western Australia, it needs to be consulted regarding any potential change in direction of action which would affect lands either currently or proposed to be vested in the Authority, or lands supporting rare, vulnerable or restricted flora and fauna species.

The concern over rehabilitation and any potential change in longer term land uses to be proposed by the proponents relates specifically to the following references in the ERMP:

- the list of species (**Table 5.2 in Section 5.12.3**) with potential for use in revegetation only includes 50 of the total of 821 vascular species recognised by Burbidge, Hopper and Van Leeuwen (1990) for the area. Such restricted speciation, even if successful would give no hope of reconstructing natural vegetation assemblages.
- knowledge of the biology and regeneration capabilities of the assemblages, rare, vulnerable, geographically restricted, endemic and also many of the widespread species is limited (for this area one might even say miniscule).
- the potential for loss of seed and propagules if the overburden is stored (**Summary Section 5, page 25**).
- the potential effects of drought which could greatly influence the success of rehabilitation (**Section 6.8.1**). No mention is made of seasonal influences upon natural recruitment and the fact that normal propagation gains, only occur in areas with aridity, as a result of seasonal circumstances (usually involving 2 to 3 favourable rain events or successive "above average" annual rainfalls). Such events cannot be arranged at will, to assist initiation and maintenance of plant growth.

- the potential effects of disease which could affect many of the proposed native species in rehabilitation areas.
- the difficulty of re-establishing mycorrhizal associations.

The proposed method of revegetation by means of broadcast seeding at a rate of 5kg/ha (**Section 5.12.4**) would impose an intolerable burden upon the native vegetation of the local area. At this rate it is estimated that a minimum of 9 tonnes of seed would be required. No mention has been made regarding the establishment of a seed orchard for this purpose or of trialling the optimum methods for the reestablishment of individual indigenous native species.

The Authority also considers the need to define in the ERMP the minimum requirements for monitoring of the rehabilitated areas.

6. NEED FOR A MT LESUEUR COAL POWER STATION TO MEET WESTERN AUSTRALIAN POWER NEEDS

i) The Harman Committee (reference) favours a combined cycle gas turbine (c.c.g.t.) of about 300 mw for the next increment of generating capacity. This is preferred to a coal fired base load station at either Collie or Mt Lesueur.

The reasons for this are:-

- At future gas prices, which are expected to be less than or not higher than $5/GJ, power generation by c.c.g.t. would be cheaper than by a coal fired station.

- The c.c.g.t. unit could be more flexible. That is it could be installed and added to incrementally thus avoiding the temporary excess capacity which would be unavoidable from a large coal fired turbine base load station of about 600 mw.

- There would be environmental advantages in burning gas compared to coal (less CO_2 produced per unit power etc.). This relates to the higher hydrogen to carbon rates in the fuel but there are other environmental benefits from lower S and N.

ii). The SECWA proposal for a 600 mw coal fired station at Collie is an alternative to Mt Lesueur and has preferable features:-

It is not in a unique part of Western Australia with respect to rare indigenous plant species and landscape values. Thus the environmental site impact is very much less.

The claimed benefits for the Mt Lesueur site seem doubtful. Regional growth at Jurien Bay would leave the area still with a small town population, whereas such growth in the Collie-Bunbury region is helping to provide a genuine regional alternative to Perth. It is more likely that the potential workforce would prefer to live in Collie-Bunbury.

iii). The argument that the Mt Lesueur power station is needed to provide cheaper power and improve the Western Australian economy is superficial because:-

. Despite the claims that high power costs prevent industrial development in Western Australia, recent statistics show that West Germany and Japan - two of the most industrially competitive countries in the world - have the highest power costs of all developed countries (West Australian, June 1990 and Harman Report).

The link between power cost and industrial success is apparently not as close as we are lead to believe.

. The argument that we need cheap power for secondary processing of minerals with high power requirement (e.g. alumina to aluminium) is self defeating. The argument for processing is to reduce our resource dependence but if processing costs are dominated by energy costs we are continuing our resource-use dependence in this case by valuing energy resources at a low price.

. Western Australia, like the rest of the industrialized world, needs to reduce our increasing power consumption per head, both to assist the overall battle against the greenhouse effect and to prepare for sharing the earth's resources more equally with underdeveloped countries.

. Although most efficient use of resources must always be a goal and we should endeavour to produce power at a low cost, this does not mean that selling it cheaply is a good policy. Cheaper electricity prices are likely to counteract demand management by protecting or increasing wasteful practices or uses.

7. CONCLUSIONS

The NPNCA believes that the Mt Lesueur area is of very great value for the conservation of flora. In this regard it is comparable with the Stirling Range and the Fitzgerald River National Parks, which are now widely recognised as the three species rich nodes of flora in this State (Burbidge, Hopper and Van Leeuwen, 1990). In addition the Lesueur area is also very significant for the fauna species as this area is only surpassed by:

- Dryandra, Dragon Rocks and Fitzgerald National Park for the diversity of mammal species,
- Kalbarri and Fitzgerald National Parks for the diversity of bird species, and
- Kalbarri National Park for the diversity of reptiles.

The area also has substantial landscape values.

recommends

The Authority sees its need for protection as being so high that even a development project of national significance should not proceed should its development substantially damage the values of the area.

Recommends N.P.

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