Carbon products from peat project Lake Muir Nature Reserve

Magnet Industries Pty Ltd

Report and recommendations
of the
Environmental Protection Authority

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Summary and recommendations

A proposal by Magnet Industries Pty Ltd to produce carbon products from peat extracted from Tordit-Gurrup Lagoon, located east of Manjimup, has been considered by the Authority following public consultation involving a Public Environmental Review. The peat would be mined by dredge and processed on an adjacent property. Tordit-Gurrup Lagoon is part of the Lake Muir Nature Reserve.

The Lake Muir Nature Reserve is a 'C' Class Reserve for Water and Conservation of Flora and Fauna. While there has been the desire for the Reserve to be up-graded to 'A' Class for many years, it has remained 'C' Class due to the pre-existing mining claims. The coal mining leases that relate to this proposal were issued in 1984, although the applications were lodged in 1970.

The main environmental features of the Lake Muir Nature Reserve are the range of valuable freshwater and other wetlands located within it. In order for the proposal to be found environmentally acceptable it is necessary for the proponent to demonstrate that the mining would not have long-term unacceptable impact on the function of the wetland system.

Magnet Industries has provided information in relation to the proposed operation and environmental setting. However, the Authority considers that that information is not satisfactory to either permit adequate prediction of environmental impact or put forward acceptable environmental management prescriptions. The Authority considers that the proponent has not demonstrated that the proposal would be or could be environmentally acceptable. In particular, the Authority is not satisfied that the following crucial issues have been adequately addressed:

- quantity and quality of the peat resource;
- environmental role of the in-situ peat;
- effect of the intrusion of the dredging operation on the fauna which uses the Nature Reserve;
- consequences of removal of the peat on the environmental quality, especially of the water, of Tordit-Gurrup Lagoon, and other wetlands given their known inter-relationships; and
- likely success of the rehabilitation technique proposed and what contingency planning can be used if unsuccessful.

The Authority has concluded that the proposal is not proven to be environmentally acceptable and recommends that it should not be approved. Any future proposal to extract peat from within the Lake Muir Nature Reserve would need to be referred to the Authority for environmental impact assessment.

The Lake Muir Nature Reserve has significant conservation value, including the rare, freshwater, peat-based ecosystems and good examples of eastern Jarrah/Marri forest contained within the Reserve; the importance to waterbirds of the Reserve wetlands; and the diversity and scientific importance of aquatic invertebrate fauna within the Reserve. These should be protected in the long term from any activity which may adversely affect them. In order to achieve such protection the Authority considers that the conservation value of the Lake Muir Nature Reserve is sufficiently high that it should be up-graded to 'A' Class. This is supported by both the Department of Conservation and Land Management and the National Parks and Nature Conservation Authority.

Recommendation 1

The Environmental Protection Authority concludes that Magnet Industries Pty Ltd has not demonstrated the environmental acceptability of the proposal to mine peat from Tordit-Gurrup Lagoon and produce carbon products, as described in the PER, and recommends that the proposal not proceed.

Recommendation 2

The Environmental Protection Authority recommends that the classification of the Lake Muir Nature Reserve (No. 31880) be amended from 'C' Class to 'A' Class as a matter of priority.

1 Introduction

Magnet Industries Pty Ltd has proposed to mine peat from within the Lake Muir Nature Reserve, east of Manjimup, and to process the material into a range of carbon and other products. The mining would taken place within coal mining leases over Tordit-Gurrup Lagoon. The company has approved coal mining leases over much of the Nature Reserve to the east of Lake Muir. Poorginup Swamp, Tordit-Gurrup Lagoon, Neeranup Swamp and Byenup Swamp are wetlands within the Nature Reserve which are covered by coal mining leases. They were issued in 1984, although they were applied for in 1970.

Activated carbon, as one of the main products to be manufactured, is a material that has experienced rapid market growth due, in no small part, to increasing pollution control and other environmental requirements throughout the world. It has particular value in fluid and gaseous purification processes, as well as in metallurgical processing, such as gold extraction.

Following referral from the Department of Mines in October 1989, the Authority determined that the proposal should be subject to formal assessment in the form of a Public Environmental Review (PER). The company prepared a report which was subsequently released for public comment for a period of eight weeks, concluding on 20 March 1990.

Issues raised in public and government submissions were summarised and the proponent prepared a response to them. In general, the submissions did not agree with the proposal being implemented, however some others provided unequivocal or conditional support.

The Authority carefully reviewed the proposal as described in the PER as well as the issues raised in submissions, the proponent's response to those issues which amplified some aspects of the proposal, as well as seeking further information from the proponent, the Department of Conservation and Land Management and the National Parks and Nature Conservation Authority.

2 Description of project

This proposal involves two types of operation, a resource extraction stage and a product generating phase. The project is based on the removal of peat from within Tordit-Gurrup Lagoon and heating of the material to produce a range of products, including activated carbon, carbon black, char, heavy hydrocarbons and waxes.

Tordit-Gurrup Lagoon (Figure 1) is part of the Lake Muir Nature Reserve (No. 31880), which is 'C' Class for the purpose of Water and Conservation of Flora and Fauna and is vested in the National Parks and Nature Conservation Authority. The Lagoon is one of a series of wetlands that constitute the fourth largest nature reserve in the South West, comprising approximately 11,311ha.

The company proposes to mine peat by dredge from Tordit-Gurrup Lagoon, and then to dewater and heat the peat in several stages to form activated carbon and other carbon products, as well as to extract waxes contained in the peat. Mining is proposed to take place for an initial period of 20 years, although the PER indicates that sufficient resource exists for at least 40 years' operation.

Peat extraction would be a daylight operation, using a cutter suction dredge with a slow moving head. According to the PER, mining would occur at the rate of 8ha each year to yield 100,000 tonnes of dry peat per annum for processing. This would require approximately 380,000 cubic metres of in-situ peat to be removed. The peat is estimated by the company to be up to 4m thick and is covered by rushes comprising principally *Baumea articulata,* as well as some other vegetation including *Melaleuca* sp and *Agonis* sp growing among the rushes. The proposed method of mining would be to remove all but the top 30cm and bottom 10 to 15 centimetres of peat in a designated area by dredge, and then to float the resultant rush and peat raft away for temporary storage. The dredge would operate within 2ha ponds, each separated by retained peat banks. Rehabilitation would be undertaken by returning the floating rush rafts to the site and fixing their position by posts.

The dredged peat would be pumped from the dredge by pipe to a freehold property adjacent to the Lagoon (Nelson Loc 9247), where the water would be removed and the peat dried in a rotary kiln. Dried peat would then be heated in a coking kiln to form char. Cooled char would be reheated in an activation kiln and in the presence of steam to produce activated carbon and other products.

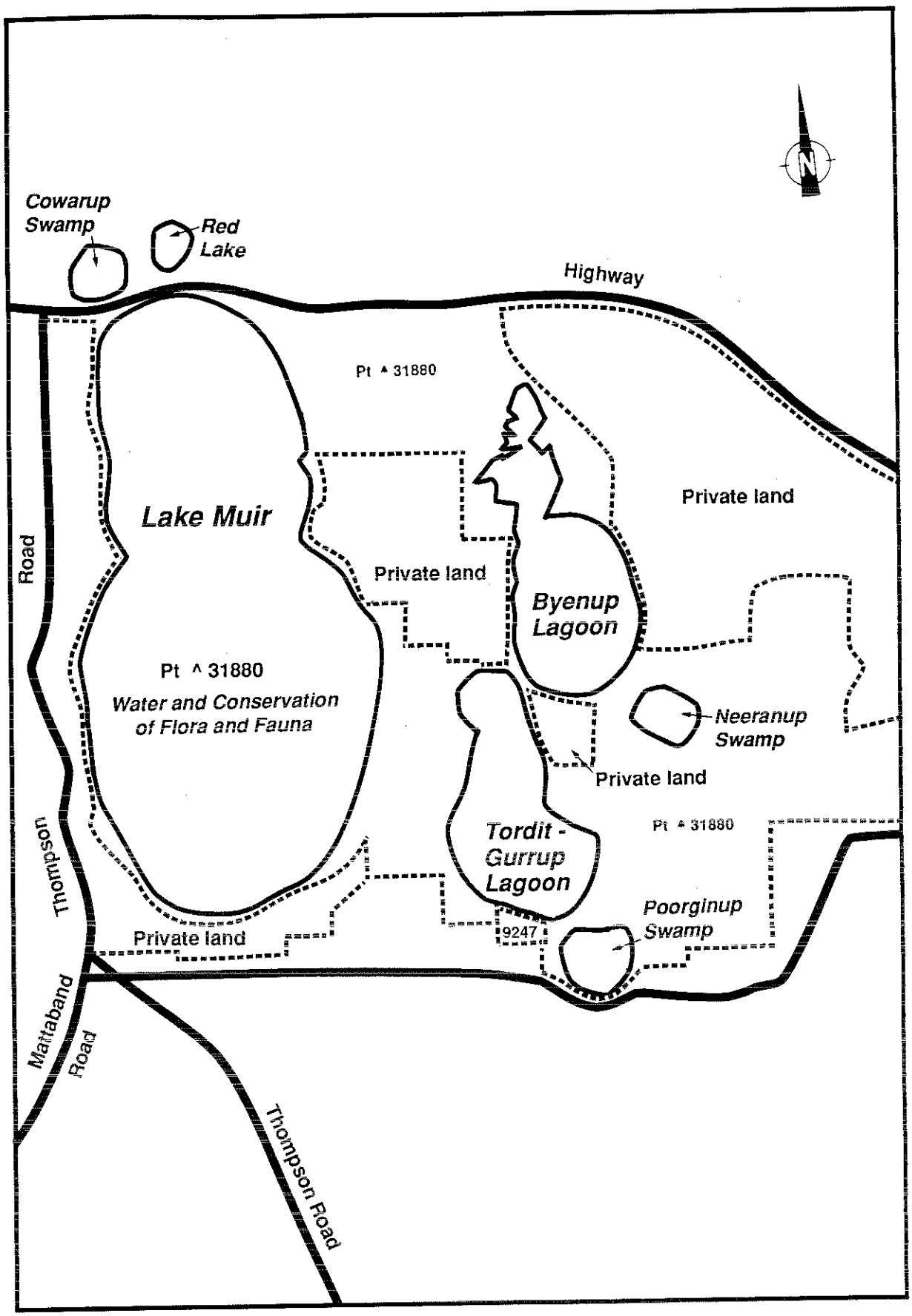

Figure 1 : Location of the proposal

Waxes in the peat would be distilled from the vapours generated in the coking kiln. The process would generate its own energy requirements and only water vapour, carbon dioxide and heat would be waste products. All solid material produced in the process would be marketable product. The company is considering the possibility of using the carbon dioxide to culture biological material (algae).

A small portion of the water from the dredging would be used for process requirements while the remainder would pass through a settlement pond prior to return to the Lagoon.

All product would be transported by road to local (Australian) market or to either Albany or Bunbury for export. Overseas sales would represent the major market for the carbon and other products. If anticipated production levels of 15,000 tonnes per year of activated carbon were achieved, this plant would be of world scale.

3 Public submissions

The Authority received written submissions from 53 members of the public, community organisations, local authorities and government agencies. An additional 72 copies of a standard letter were also received.

A detailed list of the issues raised in the submissions and those people, groups and agencies which made comment is provided in Appendix 1 Some submissions were supportive of the proposal, although only one of these (Shire of Manjimup) gave unreserved approval. The vast majority of public and government agency submissions either opposed the proposal or raised significant areas of concern in relation to its operation.

The following provides an indication of the general issues that were brought to the Authority's attention in submissions.

- Adequacy of the PER
  - The PER does not address many of the implications of the project in any detail, describe the project in detail nor give confident predictions of impacts.
- National Estate implications
  - The Lake Muir Nature Reserve has been listed on the Register of the National Estate since 1978.
- Mining in a Nature Reserve
  - Mining is incompatible to the conservation objective of the Nature Reserve.
  - Mining is appropriate within a 'C' Class Reserve.
  - The Reserve meets the requirements for Ramsar nomination, has been proposed by the Department of Conservation and Land Management and would have been accepted by the State Government except for the mining conflict.
  - This Reserve has significant conservation values because of the area of the open and closed water areas, as a drought refuge and because it contains fresh water. Waterbirds, including some that are considered rare, endangered or restricted, use the wetlands for roosting, feeding and breeding purposes, while internationally significant invertebrate fauna (water mites) have been located in some of the wetlands.
- Alternative resources
  - The company has not explored alternative resources such as wood waste, shells, newspaper and organic waste, or other peat deposits.
- Effects of mining
  - Dredging will increase the open water area, disturb fauna, remove habitat and could breach the impervious bottom of the Lagoon.
- Success of rehabilitation
  - The rush beds will not float but sink (causing their demise) and tethering of the rushes will not work.

- Effects on water resource
  - Creation of more open water areas will increase evaporation and salinity and consequently reduce water quality in the Deep River should Lake Muir overflow.
- Emissions from the process plant
  - Greenhouse gases and turbid water will be discharged into the atmosphere and Tordit-Gurrup Lagoon respectively.
- Transport effects
  - Road upgrading will increase visitation to the Reserve and increased numbers of heavy vehicles will reduce safety due to the poor condition of Muir Highway.

The proponent has provided a response to each of the issues listed in Appendix 1. These comments are presented in Appendix 2. The numbering of the response coincides with the order in Appendix 1.

4 Discussion of environmental implications

This project raises a number of significant environmental issues that need to be addressed by the Authority. Many of them were also mentioned in submissions. From those submissions and the subsequent company response, the Authority is aware of the views of the various authors. However, the Authority needs to provide its own advice to the State Government on the basis of information available to it. In arriving at its position, the Authority sought additional clarification in relation to the proposal from Magnet Industries and the status of the Lake Muir Nature Reserve from the Department of Conservation and Land Management and the National Parks and Nature Conservation Authority.

Environmental issues which were examined by the Authority in this assessment include the following:

- the general matter of mining in a nature reserve;
- mining and rehabilitation effects of this proposal;
- processing plant operation;
- site access and transport; and
- alternative resources.

In considering this proposal, the Authority has found itself in a position where many of the fundamental questions that need to be addressed in order to make confident predictions as to its environmental consequences cannot be answered with any certainty. While the company has provided or referred to as much information as already exists, it is clear to the Authority that this is not sufficient. This paucity of crucial information has caused the proponent to make some key predictions that have little or no empirical evidence to support or substantiate them and does not permit the Authority to make judgements on them. Examples of this include the presumed absence of environmental role of the peat and the long term viability of the reed rafts that would remain after mining. It is the proponent's view that the onus of demonstration that the project would not be environmentally acceptable should be placed on those who oppose the project or those who must assess its environmental implications (Appendix 2). The Authority does not concur with this position.

The environmental impact assessment process in Western Australia requires that the proposal can be supported by adequate, high quality information, with a heavy emphasis on the prediction of environmental impacts and management of these identified effects. The guidelines prepared for proposals that are being assessed by the Authority clearly indicate this. It is the responsibility of the proponent to provide information that supports their assumptions or contentions, in the same way that public and agency comments on proposals are expected to be supported and sustainable. In this case, Magnet Industries has needed to demonstrate to and convince the Authority that its proposal can be undertaken in an environmentally acceptable way.

Some of the areas in which limitations on available information have presented problems to both the proponent and the Authority are:

- no detailed nor extensive survey of the peat resource in Tordit-Gurrup has been completed;
- work to demonstrate that the reed rafts can be successfully under-dredged, floated away, remain buoyant while in storage, and continue to grow and provide habitat when returned to previously dredged ground has not been undertaken;

- no consideration has been given to contingencies if rehabilitation fails and the criteria to be used to determine rehabilitation success or failure have not been nominated; and
- there is no recognition or acceptance that the mining operation could have any environmental effects apart from being beneficial to the conservation value of the wetland and the promotion of rush growth.

The reasons why these are considered significant to the Authority are provided in the detailed discussion that follows.

4.1 Mining in a Nature Reserve

Lake Muir Nature Reserve was one of the areas considered by the Conservation Through Reserves Committee in its 1974 report (EPA 1974). It was noted by the Committee as being one of the most important waterfowl areas in the south west but under two threats, increasing salinity of the wetlands, apparently as a result of clearing of bushland in its catchment, and proposed peat mining. In its System 2 Red Book, the Authority endorsed the present status, purpose and vesting of Lake Muir Nature Reserve (C Class Reserve, Conservation of Flora and Wildlife, WA Wildlife Authority) but recommended:

- that hydrological studies on the effects of agriculture and mining and a critical review of any extension of peat mining be undertaken;
- the addition of adjacent vacant Crown land and a temporary reserve; and
- the determination of whether water supply should be added to its purpose.

With regard to peat mining proposals, the coal mining leases were applied for in 1970 and were initially opposed by the then WA Wildlife Authority and Department of Fisheries and Fauna. Following investigations into water quality during 1977-1979, the Department agreed to draft mining conditions in 1983. The coal mining leases were subsequently approved in July 1984, with conditions listed in Appendix 2 of the PER.

Following lodgement of the tenement applications in 1970, Cladium Mining Pty Ltd employed consultants to evaluate environmental implications of peat mining in the Lake Muir Nature Reserve (ERA 1971). This proposal did not proceed to detailed assessment because of the delay in granting of the coal mining leases. Following their approval in 1984, the Shire of Manjimup referred possible peat mining within the Reserve to the Authority. The Minister for Minerals and Energy agreed in 1985 that the lease condition requiring detailed mining plans to be submitted prior to any approval for peat extraction being given, would include an assessment of environmental effects and their proposed management.

As a consequence of 1986 advice from the EPA, the Minister for Minerals and Energy indicated to the holder of the coal mining leases, Magnet industries Pty Ltd, that if it intended to expand peat mining operations in to Lake Muir Nature Reserve, they should consider commencement of research studies directed towards identification of potential environmental impacts that might occur as a result of these activities. Areas of particular concern that should be addressed relate to the effects on wildlife through potential loss of habitat, hydrological effects, and the development of appropriate rehabilitation prescriptions to restore the land to its former condition.

Many submissions pointed out that the State Government's policy on mining in national parks and nature reserves should be applied to this proposal. However, as the policy applies to the issuing of exploration tenements and mining leases and, in this case, the coal mining leases were issued within the Nature Reserve in 1984, the policy cannot be applied. However, as the Mines Department initiated the process of environment impact assessment by its referral to the Authority, the question of whether the proposal is environmentally acceptable is being addressed through Part IV of the Environmental Protection Act.

Although this proposal is for 20 years of mining (ie up to 7.6 million cubic metres of in-situ peat) the company believes that there is at least 40 years' of resource in Tordit-Gurrup Lagoon. Further, while this proposal only deals with Tordit-Gurrup Lagoon, Poorginup Swamp and Byenup Lagoon also have peat reserves.

4.2 Mining and rehabilitation effects

Peat mining is traditionally undertaken by draining the site and excavation in the dry. This was the method put forward in 1971 by Cladium Mining Pty Ltd when it was evaluating peat mining within the Lake Muir Nature Reserve. It is also the method employed by Magnet Industries in its current Cowerup Swamp operation, immediately to the north of Lake Muir.

According to the PER, dredging of the peat as an alternative form of mining offers the environmental advantages of retaining considerable water in the wetland being mined and minimising water quality changes that might result from draining.

In the case of the Lake Muir Nature Reserve, there is evidence that the wetlands are linked by water flows. Hydrological investigations by Environmental Resources of Australia in 1971 and Geological Survey during 1977 to 1982 have indicated that the main wetlands in the Nature Reserve are linked in the sequence: Poorginup Swamp, Tordit-Gurrup Lagoon, Byenup Swamp then Lake Muir. Any adverse effect on any one of these will have an effect on the 'downstream' wetlands. It was for this reason that the 1971 study recommended that drainage water from Poorginup Swamp should be diverted directly into Lake Muir rather than through the other wetlands (ERA 1971) and Martin (1982) indicated that, if extraction of peat was to proceed in this area, mining should progress in the order of Byenup Swamp first, then Tordit-Gurrup Lagoon and finally Poorginup Swamp.

While the dredging method superficially appears to be environmentally attractive and benign, the proponent's expectation that there would be no direct environmental impacts relies on a number of assumptions. These include the view that the peat does not provide a habitat for any fauna, that the peat serves no function in relation to the quality or value of the Lagoon and that the closed rush systems do not rely for their continued existence on the presence or depth of peat. The PER provides little or no support for these conclusions.

While it is not possible to say that these assumptions have no validity at all, the following comments are made:

- Poorginup Swamp, which is adjacent to and 'up-stream' of Tordit-Gurrup Lagoon, contains six rare and scientifically significant invertebrate water mites (DeHann 1987). While they have not been identified in Tordit-Gurrup Lagoon, the investigations of the peat areas has been very limited;
- peat provides a very effective filter and buffering capacity, and the area and volume of peat in Tordit-Gurrup Lagoon has a strong influence on water quality. A most important value of Tordit-Gurrup Lagoon is its relatively fresh water quality in comparison to Lake Muir and Byenup Swamp; and
- the *Baumea articulata* is very well developed on the surface of the peat, with its rhizome roots extending near its surface and approximately 20cm deep. With the fluctuating water levels of the Lagoon, the peat provides moist conditions around the roots year-round, especially when the level falls below the peat surface. It appears that the *Baumea* have prospered under these alternate flooding and drying conditions (PER, p 25). Removal of the peat would cause the reed rafts that result from the dredging to float continuously, resulting in altered and probably less desirable growing conditions. This has been shown to occur at Herdsman Lake, where peat and sand has been removed by dredging. Rushes (mainly *Typha* sp) have not remained floating after the substrate has been taken away. In addition, there is a very sharp delineation in Tordit-Gurrup Lagoon and Byenup Swamp between the peat and rush closed portion and the open water areas. The change is very marked and distinctive, with *Baumea articulata* only growing over the peat. There is no peat beneath the open water.

Several submissions, including that of the Water Authority of WA, raised the possibility of increased salinity and reduced water levels resulting from the dredging. In view of the relatively small area of additional open water that would be created by the staged dredging proposed in the PER, the Authority would not expect the creation of open water areas while mining is in progress to lead to increased evaporation and hence increased salt concentrations in the water. If any significant portion of the floating rush rafts sank or died, this could become a factor over the life of mining. This would depend on the relative evaporative losses between open and closed water. It has been suggested that the losses from these sources are roughly equivalent and that salinity level changes are more dependent on the surrounding topography (ERA, p 5).

The PER makes it clear that one of the most important implications of the mining proposal relates to the need to protect the closed rush areas. It is for that reason that dredging is the preferred option. However, as mentioned earlier, it is not known if the rush beds would float, over what period and whether they would stay intact during movement to or from the dredge area. Nor is it known if they would survive in the short or long term. This is a crucial issue as the conservation quality, value and aesthetic character of the Tordit-Gurrup Lagoon depends on the retention and health of the rushes. The Authority considers that it is unlikely that the rush and peat rafts would remain floating on the surface of the Lagoon for any length of time and that water movement would cause the rafts to slowly disintegrate over time. Permanent submergence or loss of root substrate would be likely to lead to the loss of the *Baumea articulata* , *Melaleuca lateritia* and *Agonis juniperina* within the Lagoon.

In formulating this proposal the proponent has briefly considered alternate forms of peat extraction from coal mining leases within the Lake Muir Nature Reserve. The usual peat mining technique, pursued at Cowerup Swamp by Magnet Industries, is draining followed by dry excavation. If this proposal to dredge Tordit-Gurrup Lagoon is not approved, the company could propose to drain Poorginup Swamp, Tordit-Gurrup Lagoon, Byenup Swamp or the other wetlands in the Nature Reserve that are within the coal mining leases and mine the peat. Clearly such a method of mining would have environmental implications that would appear to be contradictory to the objective of maintenance of function of the wetlands system. The Authority does not have sufficient information to support the view expressed in some submissions that peat or other (unforeseen) mining of any form within the Nature Reserve would be unacceptable. Any development proposals relating to the Lake Muir Nature Reserve would require thorough investigation prior to referral to and assessment by the Environmental Protection Authority.

The PER and response by the proponent have indicated that the mining operation itself would have the potential to create noise, underwater vibration, smoke from engine emissions, light, turbidity, a pollution threat from fuels, and there would be a continuous human presence on the Lagoon. Any or all of these would represent an intrusion into an area which presently has little activity apart from adjacent agricultural (livestock) use along a portion of one side. It is likely that this level of disturbance, even if it were very well managed, would reduce the use of the wetland by fauna.

4.3 Processing plant operation

The processing of the peat, as described in the PER, appears to be relatively simple and the technology is well established. The atmospheric emissions (steam and carbon dioxide) would be relatively small in an area remote from people. If the plant was to be constructed and operated, works approval and licences under Part V of the Environmental Protection Act would need to be issued.

Concerns in relation to the processing plant relate mainly to noise, water and light emissions. Each of these are considered to be manageable. For example, screening could reduce the effects of light and, to a limited extent, noise. With regard to the quality of the return water to the Lagoon, provided the water passes through an effective retention system to reduce any particulates and residual heat, and salinity levels remain at ambient levels, this discharge should be acceptable.

4.4 Site access and transport

It is proposed that access to the site from Muir Highway would be upgraded, including construction of a new road along the southern boundary of Reserve 31880 between Thomson Road and Nelson Location 9247. This would be a requirement of the Department of Conservation and Land Management, which has already identified and marked a route. Much of this route coincides with an existing fire break. Improved roads on the west and south of the Nature Reserve would mean improved delineation of the Nature Reserve from the adjacent State Forest but could have a number of other implications. These could include increased visitation to the area and additional fire protection requirement. Clearly, these impacts would need to be recognised by the Department of Conservation and Land Management and incorporated in any management for the area. An increase in the number and frequency of visitors into a portion of the Nature Reserve that is not often used would be likely to affect conservation values.

A significant portion of the 60 kilometres of Muir Highway between Lake Muir and Manjimup is very narrow and of poor standard. The Main Roads Department has expressed concern about increased heavy vehicle traffic along it, as well as additional heavy traffic along the South West Highway between Manjimup and Bunbury and in the vicinity of Mount Barker, depending on the port of export.

4.5 Alternative resources

Most of the activated carbon produced in the world is derived from coal, wood material or coconut shell. There are a range of products and grades that can be produced and the process and carbon source determines specific qualities. Peat is not frequently used elsewhere in the world as an activated carbon source. While peat is a relatively common material in other parts of the world, reserves are not extensive in Western Australia. The proponent has indicated in their response to submissions that the Lake Muir area has the largest deposits of peat in the State.

Many submissions questioned whether peat was the only or best source material. The company has replied to those questions in Appendix 2 From that information, it is apparent that three factors influenced the company's decision:

- it had access to the peat resource through the coal mining leases, unlike other resources;
- the peat is of sufficient quantity and quality and is economically extractable; and
- other possible products that could be derived during processing of the peat, such as waxes, make the Tordit-Gurrup resource more attractive.

According to Magnet Industries, the peat deposits in the Nature Reserve are by far the largest known resource of their kind in Western Australia.

4.6 Status of the Lake Muir Nature Reserve

The Lake Muir area was declared a 'C' Class reserve for Conservation of Flora and Fauna in 1973. This was after applications for coal mining leases had been made in 1971. At that time, both the Western Australian Wildlife Authority and the Department of Fisheries and Wildlife, both of which had previously promoted the area's reservation for many years, lodged objections to the granting of the applications. Those objections were progressively withdrawn as further information was obtained, particularly in relation to the hydrogeology of the wetlands, until the leases were eventually issued in 1984.

In its submission on the PER, the Department of Conservation and Land Management pointed to the significant conservation values of the Lake Muir Nature Reserve and of Tordit-Gurrup Lagoon. These values relate to the need to protect rare, freshwater, peat-based ecosystems and good examples of eastern Jarrah/Marri forest represented in the Reserve, the importance to waterbirds of the wetlands, and the diversity and scientific importance of aquatic invertebrate fauna within the Reserve. For these reasons, both the Department of Conservation and Land Management and the National Parks and Nature Conservation Authority have advised the Authority that they believe that the Lake Muir Nature Reserve should have 'A' Class status. An additional consideration is the State Government policy which requires that all nature reserves which have conservation value should be 'A' Class.

The Lake Muir area is also listed on the Register of the National Estate. The Register describes the area as significant "because it contains vegetation associations not represented elsewhere. It is one of the most important waterfowl areas in the SouthWest and supports large populations of a wide range of species. Many species are migratory."

The significance of the National Estate on any proposal relates to the need for a Commonwealth Minister to consider implication on the National Estate when required to make a decision under Commonwealth legislation. In regard to this proposal, approval was given by the Commonwealth Treasury for foreign investment in the project in August 1989. It is understood that no further Commonwealth decisions would be required.

While the Lake Muir Nature Reserve remains classified as 'C' Class, this is only as a consequence of the existence of the coal mining leases and likelihood of a mining proposal. The reclassification of the Reserve to 'A' Class has been outstanding since 1961, and has been reiterated on a number of occasions, particularly since 1985.

5 Conclusion

The Authority considers that the Lake Muir Nature Reserve should be treated as if it were an 'A' Class Reserve and that the proponent must demonstrate the proposal's environmental acceptability.

There is insufficient information available in the PER or through existing research to allow predictions of the consequences of this project to be made with any confidence. It is the mining component which is considered to be the most environmentally significant, with the processing plant raising issues which would be expected to be manageable.

The paucity of substantialable information in relation to the:

- quantity and quality of the peat resource;
- environmental role of the in-situ peat;
- effect of the intrusion of the dredging operation on the fauna which uses the Nature Reserve;
- consequences of removal of the peat on the environmental quality, especially water, of Tordit-Gurrup Lagoon, and other wetlands given their known inter relationships; and
- likely success of the rehabilitation technique proposed and what contingency planning can be used if unsuccessful,

has lead the Authority to the view that predictions of the environmental implications of the proposal outlined in the PER can not be supported with any confidence.

The Authority believes the potential detriment effects that this mining proposal could have on the conservation values within Lake Muir Nature Reserve, and especially of the wetlands contained within it, are such that this proposal should not proceed as proposed. If a revised proposal to mine peat from within the Nature Reserve was prepared, the Authority would require that the proposal be referred for assessment. Clearly, adequate information would need to available at the time to permit a thorough evaluation to be made of its environmental implications

The current status of the Lake Muir Nature Reserve does not recognise its high conservation value. The Department of Conservation and Land Management has advised the Authority that the values possessed by the Nature Reserve put it into the highest bracket of reserves for which that Department is currently seeking reclassification to 'A' Class. This position coincides with that expressed by the National Parks and Nature Conservation Authority since 1985. The Environmental Protection Authority considers that the conservation value of the Lake Muir Nature Reserve warrants it being upgraded to 'A' Class.

Recommendation 1

The Environmental Protection Authority concludes that Magnet Industries Pty Ltd has not demonstrated the environmental acceptability of the proposal to mine peat from Tordit-Gurrup Lagoon and produce carbon products, as described in the PER, and recommends that the proposal not be implemented.

Recommendation 2

The Environmental Protection Authority recommends that the classification of the Lake Muir Nature Reserve (No. 31880) be amended from 'C' Class to 'A' Class as a matter of priority.

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Appendix 1

Issues raised in submissions to the Authority

MAGNET INDUSTRIES PTY LTD - CARBON PRODUCTS FROM PEAT PROJECT, LAKE MUIR

The following issues have been raised in submissions received by the Authority on the above proposal.

ADEQUACY OF THE PER

1. It is the opinion of the NPNCA that the PER prepared by the proponent is quite inadequate to allow assessment of the project.
2. While supporting the project to mine peat from Tordit-Gurrup Lagoon, the PER as made public by the proponent is an incomplete and unacceptable document.
3. The Shire of Manjimup re-affirmed its support of the carbon products project at Tordit-Gurrup Lagoon in view of the environmentally sensitive manner in which mining is proposed to be undertaken.
4. Where information has been used in the PER, interpretation has not shown accurate deduction.
5. An important reference not used in the PER is by Jaensch, Vervest & Hewish (1988) "Waterbirds in Nature Reserves of South-Western Australia 1981-1985: Reserves Accounts".
6. The PER's biological survey is lacking. The proponent can afford to employ specialist consultants to carry out far more detailed studies than the RAOU of the avian fauna use of the rushland that it wishes to mine.
7. In a case where a proposal will impinge on a gazetted Nature Reserve, surely it is the responsibility of the proponent to demonstrate in tangible ways rather than through unsupportable assurances and assumptions, that the environmental impacts will be as predicted and acceptable. It is not for the land owner or manager to demonstrate the reverse as they do not propose change.
8. The Company should carry out a complete biological inventory and a management plan for the area so that mining can be considered in the context of a more complete knowledge of the biota.
9. If a hard line is taken on the need for additional information, it may cause termination of a project that has significant potential benefits. However, the nature of the location proposed for mining warrants a thorough evaluation of all potential impacts.

NATIONAL ESTATE

1. Is Lake Muir part of the National Estate and what rights do mining companies have?
2. The Lake Muir system is registered on the National estate and mining is therefore strongly opposed.
3. Lake Muir Nature Reserve has been on the Register of the National Estate since 1978.

ALTERNATIVES

1. The company is not interested in alternative types of resource or alternate locations because it only has control over this resource. Its discussion of alternatives is therefore illusory only.
2. Peat is readily available in the surrounding district, but perhaps not in such large economic, individual deposits.
3. Surely coal is an economic alternative resource for the creation of activated carbon?
4. Are you aware that 25 per cent of each rubber tyre is carbon black. Can this be utilised as a resource?
5. What about newspapers as an alternative resource?
6. Why is peat preferable to other vegetable material?
7. Where else could the resource come from?
8. What are the specific requirements of materials for the economic production of high carbon content products?

9. Could mature organic compost derived from the use of metropolitan vegetable garbage not provide a vast and infinite resource?
10. There are alternatives such as sawdust or forest waste which can be used as a source of activated carbon products.
11. Are there enough peat swamps in WA of low salinity preferred by the proponent to provide 100,000 tonnes of peat production per annum?
12. The evaluation of alternatives has not been adequately researched.
13. In the Manjimup Region there is a surplus of Jarrah sawlog residue wood which is currently not utilised. It would be environmentally and economically desirable to utilise this material.

CONSERVATION VALUES

1. The Lake Muir region stands out from most other areas of the South West in terms of its relatively pristine condition and the diversity of flora and fauna.
2. The Lake Muir complex is still of sufficient integrity, scale and importance to warrant careful management and protection of its already myriad roles in serving man and his environment.
3. Lake Muir Nature Reserve is included in the WA Labor Party's State Platform for inclusion on the Ramsar Convention. The reserve has been nominated by CALM for 'A' Class reservation. The EPA should recommend that the Lake Muir Reserve be given 'A' Class status and be included on the Ramsar Convention.
4. The Lake Muir system is widely regarded as the best example of peat swamp in South Western Australia.
5. The State Government's Mining and the Environment Policy promised that 'B' and 'C' Class reserves vested in the NPNCA will be individually reviewed and either as a National Park or Nature Reserve or have its NPNCA vesting removed and that granting of an exploration licence would take place only after this review. This project should be rejected until the classification of the Lake Muir Nature Reserve has been reviewed.
6. Peat mining is incompatible with the scientific importance and conservation value of this Nature Reserve. This is supported on pages 23, 27 and 35 and Appendix C of the PER.
7. This large nature Reserve is extremely important to biological conservation in Western Australia as it includes fresh water swamps and peat formations which are rare under current climatic conditions and high salinities which prevail generally.
8. On too many occasions the long term effects of violating reserves in the name of progress have been disastrous and reserves need to remain just that, to provide a balance for the environmental changes resulting from mining etc in areas other than reserves.
9. As the area of the proposal is a Nature Reserve should be enough to halt the proposal. If it should be allowed to proceed, the EPA will have set a precedent for other proposals to mine in Nature Reserves or even National Parks. This should not be allowed to occur.
10. The importance of the wetlands in this area increases greatly in years of poor rainfall when smaller wetlands dry up.
11. This area contains a wide range of the types of wetlands to be found in the South West. The major portion of these wetlands have not to date been greatly disturbed.
12. The Spotless Crake is thought to breed in the Lake Muir wetland system.
13. The swamps are particularly important as moulting areas for Black Swans and Mountain Ducks.
14. The importance of the wetlands needs to be considered in relation to the increasing number of wetlands already or in the process of being converted from fresh to saline status in the South West region.
15. After Tordit-Gurrup Lagoon is exhausted, the company will want to develop Byenup Swamp.
16. In "A field guide to Australian Birds - Volume 1" (Slater), the Australasian Bittern is not noted as being rare and its range is stated as Southern half of Australia,

Tasmania, New Caledonia and New Zealand. Therefore, far from being rare it is fairly widespread although difficult to locate because of its habitat.

17. Encourage CALM to develop a better access, so more people may enjoy the almost pristine beauty of this lake and its wildlife.
18. Tordit-Gurrup should be open to only two forms of human activity: scientific study for the benefit of understanding and the species found there, and the visits of those who wish to enjoy the pleasure of interaction and observation of the wildlife without causing it disruption
19. Tordit-Gurrup has the highest seasonal species richness of the wetlands in the Lake Muir complex.
20. Mining in a Nature Reserve of the stature of the Lake Muir complex is entirely inappropriate.
21. The wetlands in the Lake Muir Nature Reserve constitute a system and should be managed as such.
22. Although Byenup Lagoon supports more bird species that Tordit-Gurrup, the relative species composition was very similar.
23. Birds such as White-faced Heron, Australian Shelducks and Great Egret move between the wetlands
24. Lake Muir wetland system is ranked 20 out of 197 reserves surveyed by the RAOU between 1981 and 1985 for the number of waterbird species recorded.
25. The Lake Muir Nature Reserve is an area of outstanding scientific importance with 20 insect species being unique to the area.
26. Western Australia does not need peat mining so badly that a Nature Reserve should be sacrificed.
27. This proposal is in direct conflict with the State Conservation Strategy, which is supposed to be government policy and promotes a conserver approach to the use of resources and the protection of scarce ecosystems such as wetlands.
28. Has a thorough study of any possible unique aquatic life been carried out to determine their presence in this habitat?
29. DeHaan's thesis includes a recommendation against mining in any of the Lake Muir swamps, as unique invertebrates exist in all the sites within the Nature Reserve.
30. In Briggs & Leigh (1988) "Rare or Threatened Australian Plants", there are significant numbers of rare, threatened, already extinct, endangered, vulnerable or poorly known plant species represented in the Lake Muir region.
31. The PER contains no flora classification or listing for Tordit-Gurrup Lagoon or the Lake Muir area.
32. I understand that, at a public meeting held in Manjimup on 13 March 1990, the Company representative made a commitment not to mine in Byenup Swamp for at least 100 years.
33. The Lake Muir wetlands contain two species of water mite found no where else in the world.
34. Some members believed that the notion of mining in this Nature Reserve, given its biological significance, should not be entertained. Other members felt equally strongly that there was not enough evidence presented to date which was strong enough to cause the project to be rejected. The benefits of the project to the State and the Nation outweigh any minor risk to environmental values.

MINING

1. Mining for peat has already caused permanent damage to wetlands in the Lake Muir area.
2. Mining in Tordit-Gurrup Lagoon will set a precedent that could see other very important wetlands in the reserve system mined.
3. No monitoring results are given in the PER regarding previous mining of Cowerup Swamp to determine whether that mining has had major or minor flora and fauna impacts. A summary of results from Lake Cowerup should have been provided.

4. Peat is a relatively abundant resource and there are many alternative sources of supply. Other resources in less sensitive wetlands or sawdust and other forest water could be used to make activated carbon.
5. No evidence is presented of where this mining technique has been successful previously.
6. Mining will generate noise, light, vibration, turbidity, and ecological disturbance and this will interfere with bird breeding and the life cycle of the invertebrates.
7. The effects of mining on the salinity of the water is important given the reference in the PER (p. 10) to higher salinity in Byenup Lagoon being not desirable.
8. Maps showing predicted boundaries of mined areas to supply 100,000 tonnes of peat per annum need to be constructed for 5, 10, 20 50 and 100 year predictions.
9. Should mining go ahead,supervision should be constant initially and, if the process is acceptable, taper off to once a month or so.
10. Increased open water areas will permit the creation of waves with consequences on beaches and foreshore areas.
11. A rough survey using probes shows that the depth of peat and therefore the quantity available is overestimated. What detailed in-situ survey has the proponent done to define projected volumes?
12. How many cubic metres of raw material makes one tonne of dry material?
13. If the reeds are connected to the peat through their roots, how will the reed beds be separated from the peat prior to being floated away?
14. If water levels in the Lagoon decline through poor inflow or rainfall, how will the proponent ensure that there is sufficient water to continue to float the dredge? What effects would these have and how would they be assessed if not at this time?
15. What is there to prevent the dredge from taking too much peat from both the top and bottom, in breach of the condition of mining tenement approval? How will the company ensure that the conditions are complied with and what happens if the conditions are breached?
16. Will removal of the peat material lead to lower water levels in the lagoon given the absence of the volume of fibre?
17. Being a 'C' Class reserve, mining is a permitted use.
18. Dredging is a reasonably quiet operation and the disturbance of birds in the are will not be great. They will adapt and they move around the area.
19. Even with modifications alluded to in the PER, fuel spillages from the dredge and service craft will inevitably occur, affecting water quality and fauna.
20. I would have found it helpful to my understanding if estimates had been given of the volume of peat proposed to be mined compared to the volume unreclaimed.
21. It is by no means assured that the proponent's intention to cut within 30 cm of the upper mat layer can be achieved in practice without severe disturbance and changes to the integrity of the "active horizon containing most of the invertebrates".
22. Using experience at Cowerup Swamp regarding moving the floating mats and rehabilitation is difficult to evaluate given that the form of mining there was different and no information is presented in the PER to explain how it was done and its success.
23. What is the natural angle of repose of the materials concerned?
24. What is the significance of the 60 cm maximum cut in the 45 degree line from the lake edge?
25. Where is the edge of the lake, what is the bathymetry there and how does the Mines Department propose to ensure its requirements are adhered to?
26. There is significant doubt about the volume estimates of peat available in the Tordit-Gurrup Lagoon and , consequently, the annual areal extent of extraction to meet production targets could increase.
27. Environmental disturbances not mentioned in the PER include jetty construction for fuel loading, anchoring of the dredge, placing and relocating pipelines, and turbidity from return water after peat dewatering.
28. A detailed plan showing buffer vegetation in relation to area to be mined, edge of the lagoon, edge of standing water, outlet for return water, discharge line from working area to shore, is required.

29. Will mining continue once lake levels become too low to operate the dredge?
30. A strategy is required for any fuel spillages, particularly in the lake (eg containment devices as used for petroleum slicks).
31. Noise needs to be kept to as minimum and remain consistent so wildlife, especially birds, will recolonise areas close to the operation.
32. Mining at Cowerup Swamp has left it in a mess. If approved, this proposal must be more closely monitored by the Mines Department inspectors on a regular basis.
33. It is significant that no reports have been published by Magnet Industries on the impact of mining operations at Cowerup since 1984.
34. The data for available raw material indicates that sufficient resource exists for 40 years of mining at the proposed rate but the project is for a 20 year period. It is unclear what the company's intentions are, after the initial 20 years. Also, will the other CML's be used for mining in the future?
35. In regard to the mining process, company representatives stated that they have not actually seen an example of the intended mining and rehabilitation method proposed for Tordit-Gurrup Lagoon used elsewhere in the world, where peat mining is practiced.
36. A major uncertainty relates to the reliance of the dredge on a water depth of 1.0 m to maintain floatation. It is known that Tordit-Gurrup has dried up (eg 1986). In answer to a question which posed this scenario the company representatives indicated that they would seek approval for an alternative mining method. The prospect of this eventually was not addressed in the PER and requires careful consideration.

PROCESSING

1. The PER discusses the need to remove fines from water that flows back into the lagoon. The proponent should consider constructing an artificial wetland on the proponents land to act as a biological filter for this water.
2. The processing plant is likely to emit large quantities of gaseous pollutants including sulphur dioxide, hydrogen sulphide, ammonia and aromatic hydrocarbons. A Very efficient scrubbing system will be required to remove them. Few details are provided of how this will be achieved or the expected level of pollutants in the waste gasses.
3. No explanation of what will be done with the solid wastes is given.
4. The emission of any more waste heat into the atmosphere at this critical stage of global warming is unacceptable.
5. Is the amount of CO_2 end product discharge from the plant acceptable in terms of atmospheric pollution?
6. With the exception of transport costs, surely it would be preferable from all other aspects to have the plant located in an industrial designated site so all wastes can be dealt with in a properly established infrastructure? In this way all pollution and other impacts (including visual) would be kept away from the wetlands.
7. It is claimed that the process requires no chemicals and yet it is understood that provision has been made for catalyst and other chemicals in the project budget. Which is true?
8. How many tonnes of dry material makes one tonne of product?
9. Will the return water from dredging be clear? If not, how much time will elapse before the lagoon water will become discoloured?
10. Will the return water have increased salinity level concentrations due to the washing of the peat
11. What odour controls will be used in the plant?
12. What type and volumes of emissions from the drying plant and power plants can be expected?
13. How will dust from stored dry peat, product and reject material be controlled?
14. What drainage and spill control will be used in the plant area to protect water quality beneath the site and in the lagoon?
15. There is no mention in the PER, nor does any analysis seem to have been undertaken on the proponent's contribution to the Greenhouse Effect.

16. There is no plan layout of the proposed dredging, processing and rehabilitation sequence.
17. The PER appendix states that drainage structures must be constructed with control facilities to allow release of water from lagoons at optimal times to facilitate post mining management. Where are they? What impact do they have? Who pays for their operation?
18. The proposed layout of bunds, transport corridors and processing facilities in relation to existing features of the area is not shown.
19. A detailed plan of the processing plant and its relationship to the water's edge is necessary.
20. Monitoring of temperature may be required to ensure return water is not too different to ambient lake temperature.
21. The processing plant appears to be efficient and non-polluting.
22. The process technology which is to convert the raw material into useful value-added products with the only by-product being heat, is endorsed.

WATER

1. Given the extent of various mining operations throughout the South West and their rapid expansion, it would be unwise to allow the last sizable body of permanent fresh water in the lower South West to be tampered with.
2. The Lake Muir system contains several of the most important freshwater lakes in the South West as well as forming part of the Deep River catchment, one of the very few remaining untapped freshwater systems in the South West.
3. The proposal will turn the bush into salt, which is what farmers are trying to prevent.
4. Martin's report indicates that the mechanism producing the long term salinity buffering effect is not known. How can predictions of impacts of mining be made without a sound understanding.
5. It will provide for long term research studies to be initiated especially in relation to Australian limnology.
6. We have already polluted almost every river in this State to the extent that they are undrinkable. The Deep River is one exception. If the proposal goes ahead these waters could be polluted and the start of its degradation has begun.
7. What is the role of the Muir lakelands and wetlands as a sponge (capture and release) for freshwater inputs to the Warren, Frankland or Deep River systems? Appendix C (Martin) indicates that the wetlands are not endoreic (not internal draining). No mention is can be found of the direction or volume of this outflow during and following the wet season nor into which of the three river systems it overflows.
8. The projected twenty per cent reduction in rainfall in the South West as a consequence of the Greenhouse Effect will have a direct, significant bearing on the proposal, especially in regard to water levels.
9. It is of utmost importance that a more comprehensive hydrogeological study is completed of the Muir wetlands to elucidate its relationships and role with the abutting seaward draining systems. Such a field study should consider both surface flow and the subsoil lateral high watertable flow in the sand overlying the impervious clay aquiclude.
10. The salinity buffering mechanisms in Poorginup Swamp is not yet known. Do the peat deposits not play a key role in the salinity buffering mechanism?
11. Is the seasonal change in salinity and pH reported in the PER deemed to be normal, or is it caused and/or exacerbated by the abutting farm clearing of forest?
12. The Lake Muir wetlands need to be protected from becoming hypersaline from the cleared farmland by reforestation of the whole wetlands catchment area.
13. Mining in any form will increase the volume of water needed to fill any lagoon.
14. The increased area of open water will create further loss through evaporation.
15. No data on actual salinity levels (eg. TSS) is given, only TDS.

16. The seasonal flushing of the Lagoon claimed in the Executive Summary has not occurred since 1968. Where is the flushing water expected to come from and what are the consequences if it does not take place?
17. No information is provided to show the individual catchment area for each of the Lake Muir wetlands, the rainfall needed before the ground is saturated, the evaporation rate from the wetlands and the consequences of evaporation loss caused by the increased area of open water resulting from mining.
18. The average rainfall over the past twenty years is only about two thirds of the 900 mm long term average quoted. What does this mean to the proposal and the consequences of mining.
19. The Lake Muir wetlands depend on surface drainage rather than underground sources for water.
20. It appears that there is a long term trend for salinity levels in the Lake Muir wetlands to rise, suggesting that climatic variation does not count for all of the identified change monitored in the wetlands.
21. Martin's report indicates that on-going flushing of the wetlands is essential for their maintenance. How will the project maintain or enhance natural flushing, which currently appears to be intermittent.
22. Will abstraction from the bore proposed by the company affect water levels in the wetlands? What volume would be required?
23. Will Magnet Industries stop operating if salinity levels increase as a consequence of dredging?
24. Monitoring and reporting of water levels should occur once a month during summer and bi-monthly during winter, with constant review of the results.
25. I would expect that the removal of up to four metres of peat to lead to changes in water circulation and water temperatures within Tordit-Gurrup Lagoon, with unknown consequences.
26. Is there any understood relationship between salinity, pH levels and the presence of peat, and how great a change in these levels would produce a significant change in Deep River?
27. The project is located in within the catchment of the Deep River, which is regarded as as a possible future water supply source and its catchment area was declared a 'Water Reserve' in 1978.
28. Comparatively little is known concerning the surface and groundwater hydrology of the individual lakes in the vicinity of Lake Muir and their interrelationship. The PER does very little to fill this gap.
29. With a project of this nature, centred on and making radical changes to one of the closely associated system of lakes and wetlands, a detailed knowledge of the hydrology would seem a pre-requisite and essential for gauging its impacts.
30. There needs to be a delineation of the contributing surface catchment of Tordit-Gurrup Lagoon and estimates of the volume of water it receives from this source and from groundwater flow., In terms of output there needs to be an assessment of evaporation and of possible surface and sub-surface outflow.
31. The PER did not mention the possibility of surface flow or quantity of any of the flows or their effects on the variation in volumes of water in storage, free water surface areas or water quality parameters such as salinity.
32. There is the possibility that the peat mining activity as proposed could increase the effective free water surface area of Tordit-Gurrup Lagoon, thus increasing evaporation loss. This could decrease the frequency and volume of surface and possibly sub-surface outflow, affecting the water levels and quality of Byenup downstream as well as those of Tordit-Gurrup itself.
33. The probability of receiving a 1 in 50 to 1 in 100 year flood event during the project period, including post project rehabilitation, is high. How would flooding effect mining and rehabilitation? What of he secured reed mats and other loose material resulting from mining.
34. Possible water quality changes occuring from the cutter dredge to the processing plant and finally back to the lake need to be understood. These include effects of

aeration on sulphides and sulphates and chelation of organics and heavy metal sulphides.

35. Will any organic complexes and/or precipitates formed be returned to the lake or retained in the peat and processed?
36. Will a change in pH occur, especially a lowering?
37. What effects will aeration have on the surrounding water quality at the cutter head?
38. When mining near open water, will aeration effects impinge upon this and to what extent?
39. Will a rise in water temperature occur? If so, to what extent?
40. What other changes in water quality are expected, especially nitrates, ammonium, organics, etc.
41. If mining affects water quality or quantity in the wetlands, how will those effects be felt by adjoining landowners and in the remainder of the Nature Reserve and State Forest?

CONSERVATION

1. Mining of peat will have significant long term detrimental effect on the unique ecology of the only large and permanent freshwater wetland in the South West. The area is an important refuge and breeding area for many species of water birds, including the rare and endangered Australasian bittern. The area is also renowned as having important zoographic significance because of the unique invertebrate life-forms present.
2. Table 6 in the Appendices indicates that mining of Cowerup Swamp has significantly affected its invertebrate fauna.
3. A fire management strategy needs to be produced.
4. The Tordit-Gurrup Lagoon will be permanently altered by mining, with disruption to the aquatic flora and fauna of the area.
5. How long is it estimated that organic matter deposited from the regrowth of the rush beds will take to replace the peat material removed by mining? Is sustainable peat removal possible in industry?
6. The proponent may be correct in stating that any particular form of impact may be minimal or tolerable but such statements remain pure supposition without the necessary information.
7. How can the existing flora and fauna continue in the same associations, whether submersed or semi-submersed (Executive Summary)?
8. The effect on the ecology (bird, plant, insect and animal life) can not be ascertained as we do not know the long term results of the present pressures.
9. What proof do we have that the surface reeds, having been taken to one side, will then refloat under the circumstances that apply in Tordit-Gurrup Lagoon?
10. The comment that ducks have not been seen in the closed water swamps is irrelevant to the question of whether the wetland is of importance for waterbirds in general.
11. The EPA should require that accurate field surveys be carried out specifically to allow rehabilitation aims to be properly determined since the area to be mined over 20 years is likely (on available evidence) to have only a low environmental value.
12. No details are given on page 35 as to how how the floating rush mats will be anchored and protected from dis-aggregation during the mining process.
13. A full reading of the thesis of Maureen DeHaan strengthens the claim that none of these wetlands should be mined as some of the invertebrates are found in only one of the swamps.
14. Survey and research indicate that the flora and fauna of these wetlands contain many relict species.
15. Removal of the peat and the ensuing disturbance and removal of vegetation must adversely affect the whole ecosystem
16. The mining proposal will permanently alter the habitat, there will be loss of valuable reed beds, the mining will disturb the waterbirds, disrupting the breeding cycle and lead to the loss of invertebrate fauna some of which are considered rare.

17. The physical and biological processes below the surface 30 cm active horizon do not seem to have been studied.
18. There has been no comprehensive survey of the birds that rely on the Lake Muir wetlands, so the impacts can only be speculative.
19. A survey of the flora of the Lagoon is necessary to know what will be affected.
20. Is the vegetation adapted to withstand the projected release of sulphides following mining?
21. Does not the peat layer provide a habitat for the invertebrate fauna? These will be affected by mining.
22. If there are only four Australasian Bitterns in the area surely some effort ought to be directed towards locating them and ensuring they are not disturbed.
23. Vegetational changes in the reclaimed area foreshadowed in the PER defeats the purpose of the Nature Reserve reservation.
24. This project will disrupt the the energy producers , phytoplankton and plants, in this important wetland system. Loss of these basic energy components will severely affect all of the higher order animals in the system.
25. The suggested study (p. 35) of aquatic invertebrates should occur prior to any activity on the wetland, not in the wake of mining, and it should be comprehensive.
26. A commitment to fund research programmes prior, during an post mining is required. These should concentrate on the limnology and avian roosting habitats.
27. Limnological investigations may provide a biological indicator of impact and of restoration success.
28. A three to five year intensive study covering all wetlands in the Lake Muir Nature Reserve would bring much of the information needed on waterbird usage to make sound judgements on management.
29. The statement that no impact is expected on the open water lagoon and therefore this will also be true of surrounding rushland and trees is not logical.
30. Waterbirds do not typically use trees as a summer refuge.
31. Moorhens, egrets and 'other' wading birds are not waterfowl. The Dusky Moorhen has not been observed anywhere in the Nature Reserve in eight years of RAOU surveys.
32. While ducks are not likely to be found in closed water swamps, these areas do support other waterbird species including crakes, bitterns, Purple Swamphen, Clamorous Reed-Warbler, Little Grassbird and Marsh Harrier, all of which use it for breeding.
33. To argue (p 35) that waterfowl are not expected to be affected because of the floating rush mats and yet previously indicate that closed areas are not used by waterfowl is inconsistent.
34. There will be minimal disturbance to the lake during the dredging process and the proposed method to mine eight hectares per annum over a period of twenty years is relatively minor compared with the overall lake area of 400 hectares, the total reserve area is some 10,400 hectares.
35. There seems to be double standards when, on the one hand people are not allowed to recreate in the reserve except under strict control and yet here we are entertaining the idea of mining the lagoon.
36. Only an overview of the vegetation of the Nature Reserve is provided in the PER It is generally considered that a more detailed inventory of vegetation is desirable before a management plan for the area can be compiled and the impact of mining fully evaluated.

REHABILITATION

1. The PER unquestionably assumes that the aim of rehabilitation after mining is to recreate virtually the same environment as that existing before. There are other options, such as the creation of islands or shallow (<0.5 m) water areas within the mining zone, which may provide specialised habitats to be created. The proponent should be required to consider the full range of available options.
2. How will the proponent re-establish the reed beds if the lake is deepened by removal of the peat?

3. The proponent presents no scientific evidence or commitments that it is able to rehabilitate Tordit-Gurrup Swamp after mining.
4. Most of the commitments are vague and inadequate, suggesting lack of confidence by the proponent in their own ability to rehabilitate after mining.
5. The particular process by which it is proposed that the peat would be removed and the rush vegetation restored, is yet untried.
6. The description of regeneration after the mining has been completed is sparse and makes no provisions for courses of action which will be taken should any of the presumptions prove to be false
7. There is not evidence or instance of regeneration of the reed beds in any of the deep water portions of the Lake Muir wetlands. This includes areas where sections of the fibrous layer have been undermined and broken off.
8. Without the support of the peat, the reed beds will sink rather than float when removed from the site of the dredging.
9. No evidence is given to demonstrate that the rush bed will regrow at the dredged sites.
10. Given that the existing plants have grown under and are adapted to poorly aerated conditions, how can it be assumed,ed that better aerated conditions will enhance rehabilitation
11. How will the red beds be held in place when returned after dredging?
12. Will the reeds die if they sink?
13. There is evidence in Byenup Swamp that the reeds will not regenerated without the peat basement or unless in very shallow water conditions.
14. As water levels decline from climatic variation or mining, will not the reeds retained in the buffer strips dry out, resulting in the probable death of the vegetation?
15. What will the company do if floating of the reed beds back to the dredged sites does not achieve rehabilitation
16. There will be minimal impact on the total area of the lagoon as the strip dredging will leave sufficient reed base to easily regrow.
17. The method of rehabilitation appears to offer the surest way of maintaining the current environment.
18. The buffer strips will provide a "control" situation for evaluating the effect as this mining will have.
19. To approve full scale mining without proof of successful rehabilitation is considered to be too great a risk.
20. The method of cutting and floating the reed mats, followed by replacement and anchoring using stakes and nets has not been tried on an operational scale.

TRANSPORT

1. No application has been received from the proponent to obtain necessary permits to use road trains on either routes required to enter Bunbury or Albany ports. It is unlikely that such permits would be granted as the routes are not designated to accommodate over loads. The use of standard transport combinations would be acceptable.
2. Road upgrading would be required if road trains were to be permitted. Substantial redesign of the Muir Highway junctions with Albany Highway or South West Highway would also be required.
3. The use of South West Highway from Manjimup to Bunbury would increase public concern about the level of heavy transport traffic on this road.
4. The Main Roads Department cannot support the transport option proposed for this project in its preset form as the mode of transport does not taken account of the capacity of the present road system to accommodate the level of road train traffic expected by the proponent of the project.
5. An area of concern to Council is additional vehicles using Muir Highway and Council suggests the should any Government assistance be given to this project, that the funds should be directed in this area.
6. Care will need to be taken when road building that Jarrah dieback is not spread.

7. Good roads into this area will assist CALM in protective burning and general fire protection.
8. The transport data in the per indicates that somewhere between 65,000 t and 104,000 t of product will be carried from the site. This is at variance with the 50,000 t production from the plant stated in the PER.
9. Does the comment that transport costs of the raw material has a significant effect on economic viability of the project imply that the extract of carbon products from peat is only marginally viable anyway?
10. The upgrading of access roads from the plant site to Muir Highway will almost certainly result in permanent clearing of forest and increased visitor access to the area. These impacts have not been quantified by the proponent.

OTHER ISSUES

1. A Commonwealth EIS should be prepared on this proposal because the proponent proposes to export some of the activated carbon obtained from the processing peat.
2. While there are no Aboriginal sites known within the area of Cowerup Swamp,Byenup Lagoon, Tordit-Gurrup Lagoon and Poorginup Swamp, there are a number of sites in the vicinity and as no comprehensive study has been carried out, it is possible that sites that have not yet been recorded may exist. A study to identify and document Aboriginal sites within this area should be undertaken.
3. Septic tanks as a means of human excreta disposal, in combination with a French Drain on Leach Drain are notoriously inefficient in high water table situations. What's more, high water table aquifers are in lateral contact over large areas, are easily polluted and are cumulative of toxins. Either human wastes should be removed altogether from the site or the use of the Clivus Multrum waterless, odourless, composting dunny should be mandatory.
4. Most of the present peat deposits would have been formed under cooler/moister conditions, hence replacement deposits will now and increasingly be slower.
5. No mention is made of the objections in relation to riparian rights.
6. The project timetable in the PER suggest that approval has already been given.
7. What fire control will be put in place to ensure that the peat deposits in the lagoon are protected?
8. Do we really need the end product?
9. This proposal should be supported as I find that it will bring many benefits to the specific area, as well as to Australia as a whole, with minimal environmental damage.
10. This industry will bring welcome direct employment and indirect spin-off to the business sector and service industry.
11. The old Nyamup township could be a useful site for housing the employees.
12. This proposal would add value to the present peat production.
13. Being some distance from the Muir Highway, there would be no visual impact to the passer-by or even a visitor to Lake Muir.
14. Considering the importance of the area, insufficient time has been allowed for the public to respond to this proposal. This is compounded by the incomplete informational structures of the proposal. A higher level of assessment is required.
15. The proponent has mined Cowerup Swamp for 17 years and has shown no regard for this area and has undertaken no rehabilitation work, nor outlined any plans to do so.
16. The PER contains no viable environmental management plan.
17. How can peat mining be termed a sustainable industry when it is a finite resource?
18. At the end of the 20 years, is the company going to pack up the processing plant and go away? They are more likely to seek an extension to their existing approvals.
19. While the economic benefits to the proponent are enumerated, the environmental costs to the company in the short term and community in the long term are not considered.
20. As the area has not been surveyed for Aboriginal sites, it is not correct to suggest that there are no sites.
21. No mention is made of the Company's intentions with its remaining leases in the wetlands.

22. Why is the ownership structure of the proponent (ie. overseas or Australian) not described?
23. What is the value of imported plant and capital and percentage of offshore ownership?
24. Are the proponents free to direct production or part of it to horticultural products to suit cash flow and market circumstances?
25. The mining proposal presented by Magnet Industries is acceptable and with appropriate conditions and company commitments should create little impact on the Lake Muir wetland system and specifically on Tordit-Gurrup Lagoon itself.
26. A personnel training programme should be initiated so they are aware of the sensitivity of the area.
27. The conditions to be imposed should be prepared in consultation with CALM, Water Authority and Department of Mines.
28. The project will see increased employment in the district with the obvious 'spin-off' effect, particularly in the business sector and service industry
29. It is a value-added industry and has significant economic benefits to the District, State and country.
30. It is a project that has little or no environmental issues and Council considers will be most beneficial.
31. The only visual impact will be the dredge.
32. Councillors are of the opinion that there are no sound reasons why the project should not proceed.
33. How will essential services, such as SEC power line and road access be provided? Will,they lead to more vegetation clearing?
34. Is there a plan in place to cater for an emergency or natural disaster and who will pay to put things right?
35. This proposal will in twenty years remove about 40 per cent of peat that has taken nearly 6000 years to form. This does not make environmental sense.
36. Peat is not a strategic resource and does not need to be mined.

PETITION

A petition containing the following comments was separately submitted by 52 people.

- The Lake Muir wetland system is one of Western Australia's most important nature reserves. These swamps are used by a wide variety of waterbirds for feeding, moulting and nesting. Several rare species, including the Australian bittern, are known to breed there. The Lake Muir wetlands also contain some rare invertebrates which are endemic to the area.
- CALM considers that the Lake Muir system to be the most important peat swamp system in the South West of Australia. For this reason, it is proposed by CALM for listing as a Wetland of International Importance under the Ramsar Convention. Such an important wetland should be conserved and certainly should not be mined for such an abundant material as peat.
- If the proposal goes ahead, the Tordit-Gurrup Lagoon will be permanently altered by the mining. The valuable reed beds are likely to be destroyed and the noise and vibration from the mining will disturb the breeding cycle of the waterbirds. The valuable invertebrate fauna could also be destroyed by the mining operation.
- There are many alternatives to this proposal. Peat could easily be mined in a less important area. Alternatively sawdust or forest waste could be used as a source of activated carbon products.
- This project should be rejected for the reasons given above In addition, the EPA should recommend to the State Government that it declare the Lake Muir Reserve A-Class immediately and nominate the Lake Muir Nature Reserve for inclusion in the List of Wetlands of International Importance.

RESPONDENTS TO THE INVITATION TO MAKE A SUBMISSION

The following individuals, groups, organisations and government departments provided submissions to the Authority on the Public Environmental Review.

C Garnett-Botfield	Margaret River
Warren Environment Group	Pemberton
Australian Conservation Council (South Coast)	Denmark
B Masters	Capel
Conservation Council of WA	Perth
P Cochrane	Boyup Brook
National Parks and Nature Conservation Authority	
J Smith	Pemberton
P Hayter	Denmark
Shire of Manjimup	
W Jackson	Walpole
Wetland Conservation Group Inc.	
K Tinley	Margaret River
B Hanekamp	Manjimup
M Gardner	Bunbury
E Daubney	Northcliffe
M Crossing	Northcliffe
J Coole	Kojonup
K Freeman	Pemberton
L Chapman	Northcliffe
J Lamb	Northcliffe
R Crossing	Northcliffe
D Halden	Walpole
K Ormsby	
Water Authority of WA	
G Fernie	Walpole
Coalition for Denmark's Environment	Denmark
Department of Mines	
Royal Australasian Ornithologists Union	Perth
S Rayner	Pemberton
J & L Brown	Manjimup
Wetlands Conservation Society	Perth
K Phillips-Jones	Manjimup
M Leslie	Denmark
A Harman	Denmark
C Bogunovich	Albany
Manjimup Natural History Club	
L & J Hemsley	
D Merrilees	Manjimup
P Sargison	Chittering
D Fuller	White Gum Valley
S Smith	Denmark
J Ledger	Northcliffe
Main Roads Department	
Greenforce	South Fremantle
N Godfrey	Kardinya
Department of Conservation and Land Management	
Karri D'Entrecasteaux Regional Advisory Committee	
D Oliver	Denmark
M Jenour	Boyup Brook
K Lance	Bellevue
H Sommers	Victoria Park
Australian Heritage Commission	

Appendix 2

Proponents response to issues raised in submissions

TELEPHONE (09) 453 6777
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MAGNET INDUSTRIES PTY. LTD.

665 WELSHPOOL ROAD, WATTLE GROVE, WESTERN AUSTRALIA
POSTAL ADDRESS P.O. BOX 209, CANNINGTON, WESTERN AUSTRALIA 6107
Registered Office: 665 Welshpool Road Wattle Grove, Western Australia

20th April 1990

Chairman of EPA
1, Mount Street
Perth

For the Attention of Mr C Murray

Dear Sir

Re: Magnet Industries Pty Ltd
Carbon Products from Peat Project - Lake Muir

We append for your further action the comments compiled by Magnet Industries Pty Ltd on the issues raised in Submissions received by the Environmental Protection Authority following the period of public review of the PER on the Carbon Products from Peat Proposal at Lake Muir area.

We look forward to these comments providing the necessary information to permit the earliest approval to this project.

Yours faithfully

Dr G Melville
DIRECTOR

MAGNET INDUSTRIES PTY LTD

CARBON PRODUCTS FROM PEAT PROJECT
LAKE MUIR

Comments on issues raised in submissions received by the Environmental Protection Authority following the period of public review of the PER on the above project.

ADEQUACY OF THE PER

The specific concerns which have led to statements under this heading are addressed under the various following headings. It is inferred that the PER should have been a definitive study covering all conceivable aspects and ramifications to various levels of knowledge pertaining to the project.

It is the Proponent's understanding that the public review process is to identify deficiencies. Not all of the issues under this heading relate to shortfalls of the PER.

Statements that infer a lack of deduction do little to correct the situation if the specific situation or example is not quoted.

As for references that are part of papers quoted and copied in the appendices the Proponent is puzzled as to the relevance especially as its substance is quoted in the PER.

Numerous references are made to the fact that the proposed site is in a Nature Reserve, this issue is covered in the section on 'National Estate'.

As inferred there are unknowns which the Proponent will endeavour to elucidate.

NATIONAL ESTATE

The Proponent acknowledges that Lake Muir Nature Reserve has been on the Register of the National Estate since 1978. In accordance with State legislation, as the area is a C class nature reserve mining is a permissible activity and the Proponent made application for coal mining leases over portion of the reserves in 1972. Leases pertaining to Tordit-Gurrup Lagoon were approved in Executive Council on 10 July 1984. The Proponent believes the proposed activity will have the absolute minimal change on the environment. This opinion is shared by issues raised under :

Alternatives

The viable alternatives available to the Proponent is to search for alternative deposits of peat. As CALM acknowledges "readily exploitable peat resources in the State are almost restricted to Lake Muir Nature Reserve". The Proponent is aware of deposits in Indonesia which would mean the loss of a new industry and with no financial benefit to Australia.

The Proponent has examined the alternatives especially the attractiveness and viability of alternative raw materials. In this assessment it is the

ability of the material to produce a range of products similar to peat, its availability in sufficient quantity at an economic price and access to supply. At this time alternatives are not available to the Proponent.

1. The Proponent is interested in alternative types of raw materials and alternative locations of peat for the production of carbon products especially activated carbons. The major controlling factor in the assessment is the continuity of supply, price and the range of products that can be produced from the alternatives to warrant the capital investment.

2. The availability of peat 'in the surrounding district' is not readily available and is certainly not an economic proposition.

3. Attempts to convert coal to activated carbons resulted in high ash content material which was uneconomic.

4. Carbon black cannot be converted to activated carbon as it does not have the carbon lattice to allow the level of activation and the absorption area.

5. Newspapers can be used to produce carbon; better economic use of this resource would be to repulp it and for its re-use in paper products rather than the formation of activated carbons.

6. Peat is preferable because of the wax and volatile fraction as compared with fresh vegetable material.

7. Other sources of peat include overseas deposits in Europe and Indonesia.

8. The specific requirements of materials for the economic production of high carbon content products include cheap source materials, low in inorganic content and with continuity of supply to warrant the capital investment.

9. The use of mature organic compost derived from metropolitan vegetable garbage would not provide a consistent material, it would have varying qualities of inorganic material in the vegetable matter which would depend on the species and its nutrient condition during growth.

10. Yes, sawdust and wood products will produce activated carbon. There is the cost of collection and processing prior to pyrolysis, and they will not produce the range of products that may be derived from peat.

11. The Proponent is not aware of peat swamps in WA of low salinity that can provide 100,000 tonnes of peat per annum other than that at Tordit-Gurrup.

12. The adequacy of the research of alternatives should not be assessed by the length of the discussion in the PER. Overseas deposits have been considered by the Proponent and this would mean that Australia would lose this industry and continue to import significant

quantities of activated carbons in excess of $27m/annum and other carbon of a similar value.

13. The Jarrah saw log residue can be used for some carbon products. The lack of higher polymer waxes limits its ability to bind and be utilized to meet the range of products available from peat.

CONSERVATION VALUES

The Proponent recognises the conservation value of the Lake Muir nature reserve and has in developing the project designed the operation to have minimal impact on the conservation values. The Proponent believes that the rehabilitated areas will be more conducive to bird activity than that at the present time due to increased growth rates and higher plant density. Regrowth in small sample areas have shown rapid growth within three months during the recent summer period.

Tordit-Gurrup Lagoon is between Poorginup Swamp and Byenup Lagoon. Studies have shown that the flow of water, salt movement and decrease in water quality runs from Poorginup Swamp to Tordit-Gurrup and Byenup Lagoons.

1. In considering the pristine condition of the Lake Muir complex, the current farming activities on the northern perimeter of Tordit-Gurrup Lagoon and the planting of exotic trees foreign to the area and the use of weedicides and the effect of residues leaching into Tordit-Gurrup and Byenup lagoons is far from being pristine. The CALM submission states the Lake Muir Nature Reserve as the fourth largest in the South West - not necessarily "stands out from most other areas of the South West".

2. The Proponent has no problem with this issue and in fact the commitments made in the proposal are aimed to meet these comments.

3. As recent as 12 March 1990 the Director of CALM, Dr Syd Shea is quoted in the West Australian newspaper as stating the Lake Muir Nature Reserve did not meet the criteria for listing under the Conservation of Wetlands of International Importance - RAMSAR.

4. Statement of fact.

5. Government has presumably assessed the situation and has left the Lake Muir area as a C class reserve as indicated in 3 above. It should be noted that the Proponent has leases over the area which provide for the reclamation of peat.

6. Subjective statement with no supporting scientific information why peat mining is incompatible. The references to the PER do not support the issue raised.

7. This statement, as do several others, infers that the proposed activity will significantly change the environment - this will not be the case.

8. This issue is a general statement which does not relate to the proposed activity.

9. As stated above, the Proponent has Coal Mining leases over the area and it is a matter of reviewing the terms and conditions under which the proposal can proceed. It is the Proponent's view that the existing terms and conditions cover the environmental issues.

10. This issue implies the Proponent will influence a significant reduction in the water level of Tordit-Gurrup Lagoon. This will not be the case. In years of poor rainfall of say half of the normal 900 mm the volume of material removed over the critical summer months will consist of two percent of that precipitation of the reduced rainfall.

11. This issue infers the Proponent's activity will influence the total area, this will not occur and the level of disturbance is going to be very minimal.

12. Spotless Crake has been recorded in Byenup Lagoon, but has not been recorded in Tordit-Gurrup Lagoon.

13. Statement of fact. The Proponent believes it will have no influence on changing this situation.

14. The Proponent's operation will desalinate the lagoon rather than increase the salinity level. Salt level minimisation is important to the Proponent's operation as salt impurities in the product must be removed. The salt recovered will be sold into commercial markets.

15. This statement is addressing a situation that will be addressed some time in the future, possibly in 2030. It is possible that the Company may seek access to the Byenup deposit.

16. Many statements have been made on the so called rare - Australasian Bittern. The reference quoted clearly details the widespread habitation of this species. It should be noted that 'Where to find Birds in Australia' by John Bransbury (1987) also details sightings of many of this species in seven wetlands in Western Australia and at Lake Seppings, north east of Albany. 'are often seen at the pumphouse' (p.394).

17. The Proponent has undertaken, subject to approval, to meet the cost of an 8 kilometre, 7 metre wide road off Thomson Road to the Southern end of Tordit-Gurrup Lagoon.

18. An issue that fails to recognise that the Proponent's proposed activity can proceed in harmony with the environment.

19. Statement of fact.

20. This is an opinion contrary to the Proponent's position.

21. Statement of fact and the proposed operation is within one of the lagoons with no impact on other lagoons within the system.

22. Statement of fact.

23. Statement of fact.

24. The Proponent presumes the ranking was achieved by addressing all appropriate criteria.

25. This may be the case however, the proposed operation will not threaten the survival of any of these 20 insect species, as the habitat will not be altered by the proposed activity.

26. The Proponent is not aware of the criterion used in arriving at this statement.

27. If the proposal is in direct conflict with government policy then the government, through its issue of coal mining leases and collection of lease fees has a conflict within itself and the Proponent should not be penalised by this lack of co-ordination.

28. Unique aquatic life needs to be defined. If the issue is directed to the invertebrates then the Proponent has made a commitment to a long term study into invertebrate fauna covering seasonal fluctuations of untouched habitats, and recolonisation of mined and rehabilitated areas. This study will be prepared and undertaken in consultation with CALM.

29. This statement is not in accordance with the De Haan thesis. Her studies were aimed at draining and clearing of the lagoon system and unique invertebrates were not found at all sites within the Nature Reserve.

30. The Proponent's activities only involve the aquatic plant life which will be left in situ, as the plant site is cleared freehold land outside of the Nature Reserve.

31. The PER covers the area of concern as mentioned above.

32. The commitment made at Manjimup was that the Proponent would not exercise its rights on leases held over Byenup Lagoon for the foreseeable future say 40 to 50 years.

33. The two water mites mentioned in this issue are in Poorginup Swamp and the Proponent does not intend to exercise its rights on the leases held over that area in the foreseeable future.

34. The concept of mining in a Nature Reserve is addressed under the section on National Estate. The Proponent supports the remaining points raised in the issue and undertakes to ensure minimal impact on the conservation values of Tordit-Gurrup Lagoon.

MINING

The dredging process will be achieved with no turbidity increase especially within the area of the dredge operation. The Proponent for operational reasons is interested in minimising the dispersion of the peat and therefore just sufficient agitation will be applied to achieve transport of the peat.

Minimal increase in open water areas will result from the mining operation. The only increase will be in the area of the access channel. In respect of spillage precaution a strategy for fuel spillages will be implemented and include physical devices to contain and retrieve any fuel spillage.

Noise and light control will be minimal and in all cases will be reduced to the absolute minimum within the capability of the technology.

1. This statement is not correct. If it is in reference to Cowerup Swamp this area is not part of the C Class Nature Reserve (C 31880). However, Cowerup Swamp has been significantly desalted including Red Lake and vegetation is being re-established.

   The rehabilitation conditions for Cowerup Swamp include the consolidation and levelling off any unevenness, removal of improvements and the site to be left in a clean and neat condition. The lessee to improve Cowerup Swamp and Red Lake area for waterfowl usage including the drainage of Cowerup Swamp into Red Lake, Red Lake to be freshened by drainage into Lake Muir after heavy rain, an area to be planted with millet as feed crop for wild fowl, and Cowerup Swamp be allowed to refill with fresh water at the completion of mining operations.

2. A statement which has no factual backing.

3. The PER covers the proposed activities and the terms and conditions for the Cowerup Leases have been met and rehabilitation will be undertaken by the Proponent. The Proponent sees no need to address other areas which are not pertinent to the current proposal.

4. The Proponent is unable to identify an abundant supply of peat from other areas. In fact a large quantity of peat is imported annually into Australia. The statement is totally incorrect and can be confirmed by consultation with the Department of Mines. In the case of sawdust, it does not possess the properties which enables the range of products to be produced.

5. The mining technique is used in many situations i.e. mineral sands and clearing of waterways for removing silt and decomposed vegetable matter of similar consistency as peat. However in the proposed operation the surface 30 cms will be retained and rehabilitation will follow.

6. No factual evidence is provided in support of this issue and in fact the reverse situation occurs. As stated in the submission from M Daubney, dredging is a reasonably quiet operation and the disturbance of birds in the area would not be great. Very limited bird breeding has been identified in the Tordit-Gurrup area. It should also be noted that a number of water birds etc. within the Metropolitan area, for example in Lake Monger, and Herdsman Lake exist and breed and this includes the Australasian Bittern.

7. The effect of mining will be the removal of some salt as an impurity in the product. It is estimated that some 2-5000 tonnes per annum of salt will be removed.

8. Mining boundaries will be prepared to indicate the areas to be mined.

9. The Proponent has no problem with this proposition.

10. The Proponent does not anticipate any increase in open water area and therefore increased wave creation due to the Proponent's activity will not occur.

11. The Proponent has sub-sampled the area and confirmed the 3 m plus depth of peat. The level of sampling was on a 100 m grid pattern on the Southern end of Tordit Gurrup Lagoon.

12. Two cubic metres of dry peat makes one tonne of dry peat. In the wet saturated state 3.5 - 3.8 m3 will produce 1 tonne of peat with no moisture.

13. As detailed in the PER the cutters on the slow moving head will sever the peat away from the actively growing area and be sucked up and transported to shore.

14. The question of water level may only be a problem towards the very end of summer; it is estimated that dredging operations may have to be curtailed until the winter rains arrive in drought years. It is estimated that sufficient water will be in the lagoon to enable year round operation. It should be noted that as water levels drop the salinity increases and becomes a problem. The Proponent has undertaken to maintain the salinity levels within two standard deviations of the seasonal averages.

15. The Proponent, following detailed survey of the mining area will set the cutter head and ladder to operate in a defined upward arc to ensure the top 30 cms remained and that sufficient peat is left on the base of the deposit.

16. It is estimated that the measurable difference in water level due to the operation will be a reduction of between 10 to 20 mm per annum. This is estimated on the basis of average rainfall, area of open water and does not include seepage or runoff into Tordit-Gurrup Lagoon.

17. A statement of fact.

18. The Proponent agrees with this statement.

19. This need not be the case, a strategy for fuel spillages will be implemented and include physical devices to contain and retrieve any fuel spillages.

20. On the basis of 90 per cent shrinkage of the peat in Tordit-Gurrup Lagoon on drying, 100,000 tonnes of dried peat will occupy 200,000 m3 and have occupied 380,000 m3 in the Lagoon.

21. As detailed in 16 above, the method is not complex and in the soft decomposed peat the shearing force is very low so enabling easy removal of the underlying peat.

22. The mining at Cowerup Swamp is on the basis of drainage and clearing and the collection of the top layer. The proposed mining technique is totally different to that at Cowerup Swamp.

23. The natural angle of repose varies from 33 to 48 degrees depending on the condition of material.

24. The significance of the 60cm maximum cut within 45 metres of the lake edge is to ensure the batter angle and depth of the buffer zone is safe for humans and animals. This is a condition currently on the coal mining leases in Tordit-Gurrup Lagoon.

25. The location and edge of Tordit-Gurrup Lagoon is as detailed on Frankland, National Map Reference 2228-I & 2228-IV. The question of how the Mines Department propose to ensure its requirements are adhered to can only be answered by that Department. The Proponent will put into place the monitoring and reporting procedures to ensure the Mines Department are informed on all aspects pertaining to the conditions relating to the leases.

26. The doubt about the volume estimates may vary by twenty five per cent either way. The detailed survey prior to dredging will define the actual area required to extract the volume of peat. The annual area will change as a consequence of the depth of the deposit which is in some areas in excess of 4 m.

27. The jetty or landing will be earth bunded with a facility for refuelling. Minimal environmental disturbance will occur and consideration is being made to locate these facilities on the freehold land at Nelson with an access channel to the Lagoon. Anchoring of the dredge will be with spuds and no disturbance is envisaged. The discharge line will be placed along the service channel to the dredging site. This will enable ready access for servicing. The returning water will have very little turbidity following settling. Turbidity levels will be of the same order as the free open water area.

28. The Proponent acknowledges the need for a detailed plan detailing the buffer vegetation in relation to the area to be mined, including the

positioning of the edge of standing water, position of outlet for return water and the service channel which will contain the discharge line to the shore.

29. No.

30. A strategy for fuel spillages will be implemented and include physical devices to contain and retrieve any fuel spillages.

31. Noise levels will be maintained at a minimum level to encourage wildlife activity to continue in areas close to the operation.

32. This statement in respect to Cowerup swamp operation should take into account the method of mining which requires the solar drying of the surface peat material prior to harvesting. The Proponent will rehabilitate the site on completion of the mining activity.

33. Under the terms and conditions of the Coal Mining Leases covering the Cowerup operation the Proponent reports to the Department of Mines in respect to expenditure on mining activites and is termed Report on Operations on Mining Tenements together with the quality of peat extracted and payment of royalties. The Proponent has covered all aspects of its obligations pertaining to the Coal Mining Leases.

34. The Proponent sought approval for an initial twenty years to prove the operation in the first instance. The use of the remaining CML's will be determined in the future.

35. The proposed method of mining while commonly practiced in other situations, it is not common to leave the top 30 cms of a deposit in situ. Tests have shown that the top 30 cms does float and the Proponent is confident of the feasibility of cutting the material from below and leaving the top 30 cms in close proximity to its current position.

36. The definition of "dried up" needs to be carefully defined. Peat in the deposit with no free water contains nine times its weight of water. In a dredging operation the dredge will dig an operational channel which will be the last to "dry up".

PROCESSING

Transport water will contain a level of salinity and aeration of the same order as the free open water area. Nutrient levels will be of the same order as the open water and the pH change will be negligible. More significant changes are caused by the natural annual variation in nutrient concentration, salinity and pH. Gaseous emissions will include carbon dioxide and water vapour. In the case of carbon dioxide emissions the proponent is exploring the use of this gas to culture algae for use as protein supplements.

All products and by-products have commercial markets and therefore there will be no waste products or disposal problems.

The Proponent acknowledges the need to obtain the appropriate Licence and Works Approval under Part V of the Environmental Protection Act.

1. In the PER a settling pond is specified, if the creation of an artificial wetland is acceptable the Proponent can provide appropriate area of land on the freehold land to establish an artificial wetland.

2. As stated in the PER the gaseous products produced in the operation will be scrubbed by well established procedures and the only emission gases will be carbon dioxide and water vapour.

3. All solid by-products rather than waste products have a commercial market and will be sold into these areas. There will be no solid waste material.

4. This is an emotive statement which does not warrant inclusion as a point of issue. The Proponent is exploring the possibility of using the carbon dioxide to culture algae to produce protein which will have commercial markets in animal stockfeeds.

5. The Proponent believes the amount of carbon dioxide discharge is acceptable. As mentioned in 4 above, value added products can be created with the gaseous carbon dioxide.

6. As mentioned in 3 above all by-products and even the carbon dioxide can be further processed for sale into markets. The Proponent sees no need for the process operation to take place in an industrial designated site as there are no wastes that require to be dealt with in an established infrastructure.

7. It is true that absorbents or catalysts are required in the entrapment of the gaseous sulphides and scrubbing of the other gaseous products prior to the emissions passing to the atmosphere. Activated carbon can be used to absorb sulphur dioxide and this product can then be marketed as an absorbent of mercury vapour. Chemicals may be required to remove pollutants from the product stream. The by-products formed have commercial markets.

8. The conversion rate between peat and the various products range from 1:1 for horticultural peat to 1:0.2 in the case of the top grade activated carbon. It should be noted that in the production of this activated carbon the volatile fraction will provide 0.1 which can be processed to carbon black or high purity reductants.

9. The return water will not contain any more soluble colouring matter in excess of the free open water.

10. There will be no increase in salinity level concentrations in the return water due to the dewatering of the peat.

11. Scrubbing of the gaseous products will remove the sulphides, ammonia and aromatic hydrocarbons such that the emissions will be odour free.

12. The drying plant emissions will consist of water vapour and a minor amount of carbon dioxide from the combustion of the flue gases carbon monoxide, methane and hydrogen. The water vapour will be condensed for process water. For every tonne of peat 400 litres will be condensed and used in the process.

13. The fines will be contained through cyclones and dust collectors. This product will be used as an energy source for power, steam and drying.

14. Within the plant area all quenching and washing areas will have integrated drainage systems where no process water will be able to leach into the surrounding ground.

15. As indicated in comments 4 and 5 of this section, the Proponent believes the emissions of carbon dioxide are environmentally acceptable. The Proponent intends to reduce the level of emission through its application to other commercial products.

16. Plan layouts of the proposed dredging and processing activity are being finalised. Rehabilitation sequence will follow the dredging operation as each containment area is completed.

17. Drainage structures etc. are part of the conditions for the Coal Mining Leases covering Tordit - Gurrup Lagoon. These conditions were drawn up on the basis of drainage and clearing prior to the extraction of the peat. The Proponent proposes to completely change the mining process to that detailed in the PER which has the minimal environmental impact. The existing terms and conditions meet the conditions to ensure minimal environmental impact.

18. As mentioned in 16 above and in addition transport corridors and processing facilities layout are being finalised.

19. The above mentioned layout will detail the plant relationship to the water's edge and the boundary of the Proponent's freehold land.

20. Temperature of returning water will be monitored. The Proponent will not be putting any heating process in the transport cycle and believes that the water temperature will remain at ambient lake temperature.

21. The processing plant has been designed to be efficient and non-polluting. The Proponent fully supports this issue and undertakes to ensure the operation is non-polluting.

22. Statement of fact.

WATER

The reduction in water level in the Lagoon due to the mining operation is estimated to be between 10 to 20 mm per annum. This represents two percent of the annual rainfall and does not take into account the runoff from the catchment area which is at least three times the area of Tordit-Gurrup

Lagoon. On this basis the change will be very minimal and it may not be detectable on gauge boards, as the above quoted figures are for a twelve month period and for at least four of these months the rate of precipitation is many times greater than the total reduction due to the annual mining operation.

The Proponent's observations and deduction on the Lake Muir system is that water flow is from Poorginup to Tordit-Gurrup, Byenup and then to Lake Muir covering a fall of 6 metres over the system. The accumulation of salt in Lake Muir and the apparent lack of salt deterioration of plant communities surrounding Lake Muir suggest that there is little salt seepage out of the system and therefore suggests a closed water system that has no drainage into the Warren, Frankland or Deep River Systems. Therefore no effect is anticipated on adjacent water systems.

1. This statement is made with no factual information to support the premise that the Proponent's activity would be detrimental to Tordit-Gurrup Lagoon.

2. A general statement, not totally correct, and the watershed of the Deep River is clearly defined to be to the West, South West of the Lake Muir System.

3. This statement is totally incorrect and without any factual proof; in fact, the operation will remove salt as an impurity. There is no way the salt level will increase through the proposed activities. Bush will not be turned into salt.

4. This issue is one of buffering the salinity or ensuring the salinity level does not increase above the seasonal fluctuations. As indicated earlier salt will be removed from the system as an impurity. It is estimated that between 2 - 5000 tonnes of salt will be removed from the system annually.

5. The Proponent has made the commitment in Section 7 of the PER to provide for long term research studies in relation to the limnology of Tordit-Gurrup Lagoon.

6. As stated above, salinity levels will not be increased by the operations and there is no way the operation will pollute the Deep River. Consider for a moment the salinity level in Lake Muir and its current effect on the Deep River. The Proponent's activities will not contribute to Lake Muir's salt problem nor to the pollution of the Deep River.

7. The Proponent's understanding is that the Lake Muir Wetlands is hydrologically a closed system and that there is no freshwater drainage into the Warren, Frankland or Deep River Systems. If drainage from Lake Muir occurs the salt build up in Lake Muir would not be as high and rivers such as Deep River would contain a higher salt content.

8. The Proponent does not accept that the Greenhouse effect will have a 20 percent reduction in the rainfall. Indications are that cloud cover will increase with subsequent increases in rainfall.

9. The detailed hydrogeological study mentioned in this issue would provide a better understanding of the total system. The Proponent will provide detailed information on the Tordit-Gurrup interface.

10. It is the Proponent's understanding that the so called buffering mechanism is one of movement of salt through a mass of peat rather than providing a balancing effect. This explains the differing levels of salinity in Poorginup Swamp and it is a lack of mixing that provides for the different salinities.

11. The Proponent's understanding is that seasonal variation in salinity and pH is caused by normal and natural occurrences. Naturally farming and clearing would contribute to the salinity and then the pH.

12. The Proponent agrees with this issue and it should be noted that the operation will remove salt from the system.

13. Mining will increase the need for water to fill the lagoon. It should be noted that the effect of the proposed mining will decrease the water level by 2 cms on an annual basis and with a 90 cm rainfall plus runoff and seepage the effect will be minimal.

14. The Proponent will endeavour to minimise any increase in the area of open water.

15. From detailed studies of the dissolved salts the chloride component represented 80 percent of the total dissolved solids.

16. The seasonal flushing or movement of salinity within the Lake Muir system between lagoons and swamp continue throughout the year by capillary action and seepage. It is acknowledged that the flushing is not on the basis of an over flow of water from one lagoon to the other. However it is well established that seepage occurs between the lagoons and transporting dissolved salts which eventually end up in Lake Muir.

17. As mentioned above the ground between the lagoons does not need to be saturated to have movement of salts between the lagoons. The Proponent does not expect to increase the open water area and therefore the evaporation loss should remain at the current level.

18. Information provided to the Proponent (Bureau of Meteorology) does not support this comment.

19. Statement of fact.

20. The closed nature of the system in the Lake Muir wetlands means that salt included in precipitation and from the watershed area is accumulating in the Wetland system. It should be noted that the

proposed operation will remove between 2 - 5000 tonnes of salt from Tordit-Gurrup Lagoon.

21. As mentioned above the term flushing does not describe the movement of saline waters between the wetlands. It is more appropriate to view it as seepage between the wetlands with a 6 m fall from Poorginup swamp through to Lake Muir. This seepage is continual either by head of water or capillary action between the systems.

22. The volume of water that may be drawn from the proposed bore will be a small fraction of the water which until recently was utilised by the forest vegetation on the freehold land which was cleared by the previous owner. The Proponent sees that its operation of the bore will have no effect on the water level in the wetlands.

23. Yes, Magnet Industries will stop operating the dredge if salinity levels increase to the levels indicated as part of the conditions of operating the leases that cover Tordit-Gurrup Lagoon.

24. The Proponent has no problem with making the water level readings available and for them to be reviewed.

25. As stated in the PER the containment areas are to be closed at the end of mining to allow for rehabilitation to take place. Circulation will be very limited and it is anticipated that there will be no effect on water temperature.

26. Salinity and pH are effected by evaporation. Peat is relatively stable within the lagoon and this stability includes pH. Its influence on salinity is negligible and can only affect salinity or dissolved solids when a significant change of oxidation occurs. This depends on the amount of reduced inorganic material being oxidized and coming into solution. It is the Proponent's understanding that any change due to the removal of peat is going to decrease salinity, have no change on the annual fluctuation of pH and definitely no influence on the quality of the water in Deep River.

27. This statement is made without supporting documentation and all indications are that the project location is <u>not</u> within the catchment of the Deep River. As previously mentioned the watershed area for Deep River is to the west, south west of the location and it is well established that water movement is in a northerly direction on the eastern side of Lake Muir. In addition if Lake Muir is a source of water for the Deep River then the salinity levels in Lake Muir should be dropping not increasing as is the current situation. The Proponent believes the Lake Muir system is closed and there is little or no seepage into the Deep River. (Frankland National Map Reference 2228-I + 2228-IV)

28. This statement is true. The proposed operation will collect data that will give a better understanding of the hydrology.

29. This issue is appropriate and it should be understood that the project is removing peat, salt and the water requirement is of the

order of 2 cms over the area of Tordit-Gurrup per annum. Rainfall accounts for a direct replenishment of 90 cms plus the run off from the surrounding area of at least three times the area of Tordit-Gurrup Lagoon, and also seepage.

30. These measurements and studies are part of the ongoing studies the Proponent has made a commitment to assist in providing especially in respect to precipitation, run-off measurements, free open water level variation due to precipitation etc.

31. As mentioned elsewhere surface flow and seepage occurs which directly effects the salinity and volumes of water. Detailed measurements will assist to understand the system.

32. As mentioned elsewhere it is the Proponent's understanding and commitment that the effective free water surface area will not be significantly increased. As such no significant change in evaporative loss or quality of Tordit-Gurrup or Byenup Lagoons will occur.

33. Flooding or as inferred the filling of the lagoon would have very little effect on the operation. The areas being rehabilitated would float in deeper water as would the majority of the deposit. The Proponent does not see that there would be loose material resulting from the mining that would pose a problem if flooding should occur.

34. The dredge operation will introduce very little aeration to the material being taken ashore. Decantation does not introduce air. The effect of aeration on sulphides is to form sulphates as detailed in the PER. Chelation should have occurred if it is going to during the decomposition period of up to 5000 years. No heavy metal sulphides or oxides have been detected in samples supplied to the Western Australian and Victorian Government Laboratories.

35. As stated above stable soluble organic complexes will be minimal or non existent as peat is often used to remove organics from water and no organic complexes will be formed and returned to the Lagoon.

36. The Proponent believes that within the annual fluctuation of pH there will be no effect caused by the operation on the pH of Tordit-Gurrup Lagoon.

37. The effects of aeration on the surrounding water quality would be minimal and beneficial to fauna and flora activity.

38. No effect in aeration will occur due to mining in close proximity to the open water. More aeration takes place at the surface of the water than any effect that may occur through the proposed activity.

39. No rise in water temperature will occur as there is little energy put into the system.

40. Changes in water quality are expected to be minimal, considering the extremely small concentrations of nitrates, ammonium ions and organics.

41. The effect on adjoining landowners and in the remainder of the Nature Reserve will be extremely minimal. In the case of landowners they may contribute far more due to soil erosion, fertilizer application, weedicide application and dust creation by ploughing than anything the proposed operation could possibly cause.

CONSERVATION

It is important in assessing the environmental impact of the proposed operation to relate the area being mined at any point in time to its proportion of Tordit-Gurrup Lagoon. For instance say the annual area to be mined is ten hectares. After the first three months two and a half hectares have been mined, consolidated and commenced rehabilitation. This area represents 0.3 per cent of Tordit-Gurrup Lagoon or 0.5 per cent of the peat deposit. Or as viewed by most of the submissions received on the PER, on the area of the Lake Muir Nature Reserve (11,310.8 ha). On this basis 0.022 per cent of the area of the C class Nature Reserve. As previously mentioned rehabilitation after three months of an area where the surface material has been removed juvenile Baumea Articulata had re-established and grown to a height of 150 mm.

In respect to the impact of this level of activity on the waterbird population the Proponent is convinced that no discernable change will be caused by the proposed activity.

Similarly the impact on fauna and flora will be of a same order and effect as on the waterbird population.

The Proponent does not anticipate any change in species representation due to the proposed activity.

1. This statement is made without any factual detail to support the comments. In respect to the Australasian Bittern, M Daubney's submission clearly details that the Australasian Bittern is far from being rare, it is fairly widespread. In respect to the invertebrates, Dr M Harvey of the Western Australian Museum has informed the Proponent that it is the annual aeration of the Poorginup Swamp that make it a habitat that will support these animals.

2. Table 6 in the excerpt of the De Haan thesis indicates the sterile nature of Cowerup Swamp which is partly due to the high salinity level. To a lesser degree this is reflected in Byenup Lagoon. Poorginup Swamp is the more fertile of the Lake Muir system.

3. The Proponent has already had preliminary discussions on the proposed fire management strategy with officers of CALM.

4. The Proponent refutes this statement and Tordit-Gurrup will not be permanently altered. This statement is made without any factual detail and is therefore very subjective and with no substance.

5. With adequate aeration significant deposition of organic matter can be laid down to form peat material. For instance sea grasses help and other plants can provide a sustainable system.

6. If this statement holds for the Proponent it is also applicable to the author of this comment.

7. If the author of this issue had understood the beginning of the quoted sentence it would have provided the answer. By leaving this section in situ the existing fauna and flora population will continue in the same association whether it is normally submersed or semi-submersed as in the deposit prior to mining.

8. The Proponent agrees that there are areas that require further research and the Proponent has made a commitment to put into place these studies.

9. The rush material continues to float at all times. By removing the waterlogged material the mats will have an increase in buoyancy. The Proponent has demonstrated in small scale experiments that the rush material will float and continue to grow under the mining procedure proposed. In addition floating mats occur in both Tordit-Gurrup and Byenup Lagoons.

10. This comment in the PER has been taken out of context and records an observation which is the only way the importance of the area can be judged.

11. There is a contradiction in this statement. However, the Proponent has undertaken to research and report annually to the Mines Department and CALM on the rehabilitation.

12. Rush mat consolidation will be achieved with stakes and the way in which the mats will be cut will ensure the tying together with each other. After dredging, containment area access will be closed by dredging material to block the entrance to the area.

13. The De Haan thesis supports the proposed operation in a number of aspects, in particular the mining below the top 30 cms, the improved richness and diversity of invertebrates where the peat is annually aerated, i.e. Poorginup Swamp.

14. This statement is made without any reference that would support the comment.

15. This statement is by a person who has not fully understood the process and the comment is without foundation.

16. This statement is totally misguided and shows a misunderstanding of the proposed activity. A number of the previous comments refute every point made in this statement.

17. The activity below 30 cms is mainly chemical changes with little bacterial activity in an anaerobic environment. If the deposit has withstood 5000 years it is very stable.

18. The Proponent is interested in only part of the Lake Muir wetlands and purports that activity will have no impact on the system as implied in this statement.

19. Flora samples and mats will be available for researchers to determine the effect of the operation. The Proponent believes that there will be extremely minimal effect on the flora.

20. The sulphide release is naturally occurring during summer months as the water level drops and air is pulled into the deposit which oxidises the sulphides to sulphate. Vegetation is existing in association with sulphide and at the same level and concentration.

21. Surface peat yes, but below a few centimeters the anaerobic conditions will cause death.

22. Australasian Bitterns are not rare to the South West of Western Australia, as detailed in "Where to Find Birds in Australia" by John Bransbury (1987).

23. The PER does not foreshadow vegetational changes in the reclaimed area in respect to biological systems and therefore will not occur.

24. This statement is made with no reference or proof that the proposed activity will disrupt the 'energy producers'. The Proponent refutes that it will cause any change in this situation.

25. If the study is performed early in the mining activity any contrast can be determined rather than speculation.

26. The Proponent accepts the need for these studies and believes on site studies with direct comparison can determine the exact situation rather than speculation.

27. Statement of fact which the Proponent supports.

28. Agreed that the proposed study would provide the basis for management of the system.

29. The author of this issue would have provided greater insight had the logical approach been given.

30. The Proponent fails to understand the relevance of this issue.

31. Statement of fact.

32. The Proponent acknowledges that waterbird species do inhabit rushland habitats. However, little activity within these areas have been detected in Tordit-Gurrup Lagoon. The Proponent intends to leave tracks of the rushland untouched and in those areas that are mined the rush will continue to grow and provide a habitat of a similar nature to areas that support the species mentioned.

33. It is not the Proponent that purports there are a number of waterbirds in the rushland. If they do not inhabit the area then they cannot be affected.

34. This is a statement of fact which the Proponent totally agrees that there will be minimal disturbance to the area.

35. This issue is one for Government. The Government following detailed examination of the Lake Muir system from 1972 - 1984 issued to the Proponent leases covering a major portion of the peat reserves in the area in question. Since that date fees have been paid to maintain the leases to mine the peat.

36. Mining will only take place below the top 30 cms of the aqueous peat material in an extremely small area of the Nature Reserve within Coal Mining Leases held by the Proponent. The vegetation of the Mine Site is uniform and documentated in the PER.

REHABILITATION

Currently naturally formed, floating rush beds exist in Byenup and Tordit-Gurrup Lagoons. During the winter months when the open free water levels can be three metres plus, the majority of the peat deposit actually floats. The peat surface of the deposit is usually at the level of the free water and only rises above the water level during summer when the deposit sits on the base of the Lagoon. The height of the material above the free water is the result of compaction due to the weight of the peat plus the entrapped water on that material below the water level.

As stated in the PER the upper 30 cms of the peat deposit is the active horizon where most physical and biological processes take place. Within this layer is progression of decomposition of the plant material to the formation of peat. This process proceeds whether there is 30 cms or 3 metres of peat below the surface.

Therefore the Proponent is confident that the mats will be consolidated, rush growth will continue and growth rate may increase so creating a situation similar to the naturally occurring floating rush beds.

The method of forming the rush mats will be by traversing the dredge over say a 30 metre area cutting below 30 cms and removing the peat to the desired depth while the surface 30 cms float attached to the main deposit. Once the peat is removed the 30 metre arc will be cut into say 3/5 metre lengths with keyed sections to enable the tying together of this material. Once free floating it will be moved by the work punt a short distance to allow the dredge to proceed. On completing 200 square metres the material

from this area will be floated back and consolidated. In this way at any point in time the area of unconsolidated material will not exceed 400 square metres.

1. This comment is a quote from Mr Bernie Masters' submission, but fails to mention his positive comments, i.e. "While this is a reasonable aim and, in my professional view, likely to be easily accomplished", which forms part of the same paragraph. The Proponent has no problem with the concept of forming islands within the mining area and if acceptable will form islands in the mined areas.

2. This comment fails to realise that the existing rush beds are floating during the winter months. The proposed re-establishment is basically the consolidation of the mats in a confined area.

3. Evidence is provided in the PER that by the increased aeration of the root zone, this will increase growth and together with the increased buoyancy, the task of rehabilitation will be achieved within a relatively short time.

4. The commitments made by the Proponent were deliberately made wide to allow for the inputs from CALM and other concerned bodies. Whether they are inadequate depends on the information which the author may have which is not presented in this statement.

5. As mentioned above, trials have been carried out and the Proponent is confident that it will be achieved.

6. As stated in the PER and elsewhere the rate of re-generation will directly be determined by the nutrient levels and the form of these nutrients. The only variant in the growth rate will be the annual fluctuation of salinity levels which will decrease as the operation will remove salt from the system. The Proponent has undertaken to report detail procedures undertaken in rehabilitation, any failures and remedial action taken.

7. In both Tordit-Gurrup and Byenup floating reed beds exist and continue to grow. If what is inferred that the break away portions die then why do we not detect a collection of submerged decomposing beds. This is not the case.

8. This issue is totally incorrect. The reed beds are established first and with the accumulation of vegetation the peat is formed. The buoyancy is provided by recent material rather than the decomposed and waterlogged peat.

9. The rush beds at no time during the operation will stop growing. In fact nutrients in a more preferred form will be available and provide for the root growth that will consolidate the mats.

10. The existing growth rate is low because of the reduced form of nutrients which if high enough burns the roots etc. and this dead material becomes part of the peat deposit. This continual limitation to growth due to burning of roots and nutrients of appropriate

oxidation state being limited, results in the poor standard of rush that occur in Tordit-Gurrup Lagoon. When fires have gone through the area the oxidized nutrients as ash have provided regrowth with far more vigour and strength in the plants. The increase in aeration will provide the mats with appropriate oxidized nutrients rather than toxic materials and thus will enhance root growth and tie the mats together in the rehabilitation process.

11. The rush beds will be held in a defined area and tied together with each other by the way the mats were cut following the removal of peat. Temporary stakes will be used to hold the mats while they consolidate.

12. The buoyancy of the plant material is achieved by the vacuoles in the plant tissue. If the material sinks it is probably partly decomposed prior to it losing its buoyancy.

13. More detailed information is required to comment in detail on this issue. For instance the peat basement has no buoyancy compared with growing rush material. New reed beds do not come with peat and therefore the logic of the statement does not support this issue. By removing the waterlogged peat the rush material will have increased buoyancy.

14. No; the annual drying out of the Poorginup Swamp has in fact increased the species richness and diversity. Peat material is able to hold many times its own weight of water which supports growth through the summer period.

15. The Proponent is confident that the rush beds and mats can be consolidated to achieve rehabilitation. In the situation of closed water the decrease in the reducing environment will encourage growth of the rush and will enlarge the rush mats. The Proponent is confident that rush regrowth will occur following mining. Sample areas where the surface material was removed has shown regrowth within three months over the summer period.

16. This is a positive issue which the Proponent will ensure is achieved.

17. The Proponent believes that growth of the rush mats following mining will be more vigorous with a higher possibility of providing the nesting and breeding environment required by the water birds.

18. Statement of fact.

19. This issue reflects the limited knowledge of its author and a lack of understanding of the flotation of the deposit and its ability for regrowth. In areas where the top layer was removed for the collection of samples, within three months juvenile plants had been established and growth had reached 150 mm in height.

20. The statement is correct. The Proponent is confident following trial situations that all aspects of the rehabilitation will be successful. Naturally until approval is given for the full commercial scale

operation to proceed the operation cannot be demonstrated at that level.

TRANSPORT

As mentioned below transport from the site will need to cater for 25,000 to 40,000 tonnes per annum. It is the Proponent's intention to use standard transport combinations currently used for transporting peat from its Cowerup operation. The effect on the roads has been discussed with the Manjimup Shire and the local CALM Officers. It is anticipated that the loads will not be excessive or cause problems to the road system. There is a narrow section of the Muirs Highway which may need to be widened in the future. Discussions have been held with the Manjimup Shire and CALM on the construction of the access road from Thomson Road to the site.

1. The Proponent has not applied for the necessary permits for the use of road trains. It is currently proposed to use standard transport combinations.

2. As stated in 1. standard combinations will be used to transport the product from the site.

3. The Proponent believes the transport traffic will be no greater from this proposed operation than that of the timber industry which the Proponent has been informed is in a decline in the area.

4. As mentioned in 1. above standard transport combinations will be used.

5. The Proponent supports this issue from the Shire of Manjimup in the effort to provide a suitable road system.

6. The Proponent is in consultation with CALM to ensure the road building does not spread jarrah dieback.

7. Statement of fact.

8. As stated in the PER the maximum weight of product is 50,000 tonnes. The total projected weight of peat to be reclaimed is 100,000 tonnes, some 5,000 tonnes will be sold as horticultural peat; Char production requires at least double the weight of peat and activated carbon requires five times the final weight as peat. On that basis if all the remaining peat after meeting the horticultural market requirements is converted to activated carbon then the total weight of product available for transport from the site would be 24,000 tonnes. The Proponent believes depending on the market requirement the weight of product from this site over a 12 month period will range from 25,000 to 40,000 tonnes.

9. No, where only 10 percent of the transport load is the desired material then the economics of transporting this material is questionable.

10. As recently as the 6th April 1990 fire breaks have been created by CALM which gives increased access to the area and may result in increased visitor access to the area.

OTHER ISSUES

1. The Proponent believes there is no need for a Commonwealth EIS. Foreign Investment Review Board approval has been obtained for the funding of the project.

2. As stated in the PER the Proponent will undertake all statutory obligations to preserve Aboriginal sites etc. The Proponent will survey the mining site for Aboriginal sites.

3. Treatment of human waste will be in accordance with the local requirements.

4. The fact that peat was deposited under cooler/moister conditions need not be so considering peat deposits in such countries as Indonesia which are definitely moist but not cooler. Replacement of the deposit is directly dependent on the growth rate and many factors can influence this situation. As we are all aware tropical growth rates are far higher than cooler environments.

5. It is the Proponent's understanding that there are no objections in respect to riparian rights.

6. Any time table is subject to the appropriate approvals.

7. All necessary procedures will be put into place to ensure efficient fire control.

8. Whether Australia needs the end products can be answered by the imports of these products and the fact that Australians spend in the vicinity of $50 million per annum for these products.

9. Statement of fact which the Proponent believes will have a marked benefit for Australia.

10. Increased economic activity will occur in the immediate area and flow on to other areas.

11. The Proponent is actively considering the old Nyamup township for accommodation of staff.

12. The value added to present peat production will be significantly increased by the proposed operation.

13. The plant will be sited to minimise visual impact and it is expected that the operation will cause no concern.

14. A higher level of assessment or as indicated insufficient time was allowed for the assessment indicates more time was required to acquaint the author with the subject.

15. This statement is incorrect. The PER does not outline rehabilitation work for Cowerup Swamp because it is not part of this proposal. The rehabilitation requirements of the lease will be met by the Proponent and are detailed in the reply to issue 1 under Mining.

16. The Proponent refutes this issue. The wording infers the proposal is not viable, this is not so and the management of the environment has received considerable effort.

17. The industry is sustainable on the basis of the deposit and the fact that subsequent growth may contribute to future deposits.

18. Time will tell what the Proponent's actions may be in twenty years. The more important aspect is the conditions under which the Proponent may operate the leases in the first twenty years.

19 As detailed in the PER the environmental impact will be minimal and there will be no long term cost to the community and in fact it will be a significant benefit to many areas of the community.

20. The statement made in the PER is 'there are no known aboriginal sites in the area'.

21. The Proponent has not commented on its remaining leases because it is currently interested in the proposed operation and any comment would be subject to the outcome of the current proposal.

22. The ownership was not spelt out as the Proponent did not see that an environmental review required such consideration. The Foreign Investment Review Board has approved the project.

23. As indicated above in 22. Foreign Investment Review Board approval was granted in July 1989.

24. The Proponent is free to direct production and products to meet market circumstances.

25. The Proponent totally agrees with this statement of fact.

26. All staff will be trained to ensure the maintenance of the environment of the area.

27. Statement which the Proponent has no problem with the named Government instrumentalities being involved in formulating the conditions.

28. A statement of fact which the Proponent is keen to initiate.

29. A statement of fact.

30. A statement of fact.

31. A statement of fact.

32. A statement of fact.

33. The Proponent will generate its own power so there is no need for power line access to the site. Road access will require some clearing. CALM wish to realign the road to provide better fire fighting control and the degree of clearing is in CALM's control.

34. The Proponent will take responsibility for all disasters caused by its operations in the area and as such will be responsible for rectification of the damage.

35. The Proponent believes the growth rate of rush mats following dredging will show a marked improvement and provide an appropriate area for water bird breeding and other biological activity.

36. Subjective statement which can be applied to everything man has done and will do in the future.

PETITION

Some of the statements in the petition are not factually correct and do not directly relate to Tordit-Gurrup Lagoon. CALM may have nominated the Lake Muir wetland system for consideration under the RAMSAR Convention. However, the Director of CALM has recently stated it does not meet the criteria.

There is no factual evidence that the statements made will actually happen and, in fact, the Proponent has undertaken that this will not be the case.

Here again, comments are made without any factual information, particularly in reference to other sources of peat and for that matter the suggestion of sawdust clearly shows a total lack of understanding of the detail in the PER.

CALM SUBMISSION

The CALM submission is subjective, contains contradictions and infers situations which have not been shown by surveys or proven by CALM.

> 'Its combination of open water and closed rushes make it especially important for breeding'.

This has not been shown by the RAOU.

> 'Tordit-Gurrup Lagoon provides an important habitat for Australasian Bitterns, a comparatively rare species that has been declining in number since the turn of the century (Carter 1923)'.

Firstly Australasian Bittern is not rare and its widespread breeding and habitation in the south west as detailed in "A Field Guide to Australian Birds - Vol. 1" by P. Slater and also "Where to find Birds in Australia"

by J Bransbury 1987. The habitat is widespread throughout southern Australia and includes Herdsman Lake in the metropolitan area of Perth.

It is surprising that a 1923 reference is the best CALM can quote.

The statement that deep peat beds may be acting as important refuge for many species of invertebrates can only be if the level of aeration is high as sulphide and ammonia would terminate their biological activity.

CALM continue to push the fact that back in 1961 an application was made for an A class reserve. History has shown that this application was not successful.

The Proponent believes that significant damage will not occur to the conservation values and that rehabilitation can be achieved.

In the section addressing the analysis of the PER, statements and assumptions are made which are not correct and indicates CALM's limited understanding of the system.

> 'No tests have been carried out in this regard'

Turbidity and settling rates have been examined on Tordit-Gurrup peat suspensions by the Victorian Government SEC research Laboratories who have performed detailed analysis together with a West Australian consulting research company.

> 'With the dredge in free water, there is a potential for turbidity to effect the entire lake'.

Here again a lack of understanding is clearly demonstrated. For instance the free water has no peat and the Proponent is not interested in operating a non productive activity. Further the speed of the cutting head will be such as to minimise the release of material beyond that taken through the dredge pumps.

Contradictions occur within the submission. The statement:-

> 'all of the fresher swamps and lakes, including Tordit-Gurrup Lagoon, have entire catchments which are largely uncleared and little disturbed. Selective logging and regeneration has occurred adjacent to the Lagoon.'

is in direct contrast to the statement by the Australian Heritage Commission:-

> 'The level of salinity of the lakes and swamps appears to be increasing, due to the agricultural clearing of the surrounding bushland.'

The submission also states:-

'The direction of flow is from Poorginup Swamp "downstream", i.e. from small to largest, and water quality, especially salinity, decreases in the same order.'

but in a later section states:-

'Although there is probably some underground water movement, the flushing referred to in the report has not been proven.'

In fact salinity increases from small to largest, rather than decreases.

'In the mid-1970's and in 1989 more than 50,000 ducks were recorded in Lake Muir in late summer.'

Records have shown that Lake Muir was a dry salt pan during these periods and it is known that bird life is not attracted to salt pans.

Answers to the remaining comments are included in the previous sections.

The above are some of the examples that lead to the opening assessment.

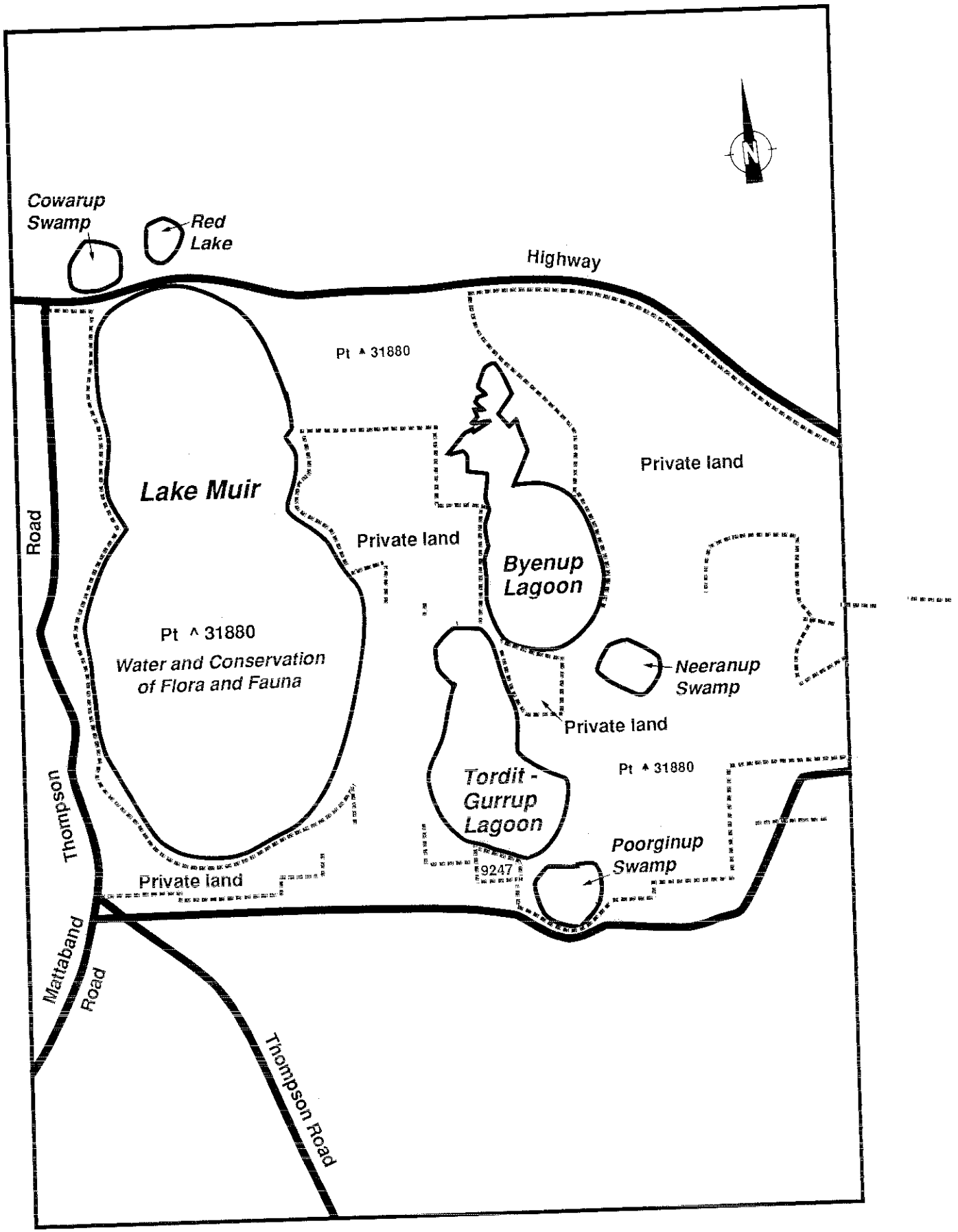

Figure 1 : Location of the proposal