Orebody 18 iron ore mine, (ML 244SA), 32 km east of Newman, Shire of East Pilbara

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BHP Iron Ore Pty Ltd

Report and recommendations
of the Environmental Protection Authority

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Summary

This report is to provide the Environmental Protection Authority (EPA) advice and recommendations to the Minister for the Environment on the environmental factors relevant to the proposal to develop the Orebody 18 iron ore mine on Mineral Lease 244SA, 32 km east of the township of Newman in the Shire of East Pilbara.

The proponent, BHP Iron Ore Pty Ltd, proposes to develop an open cut iron ore mining operation at Orebody 18 involving mining 116 Mt of ore at a rate of up to 15 Mtpa for a mine life of 12 to 15 years. Support infrastructure includes an 8 km rail spur and crushing, screening and load out facilities.

It is the EPA's opinion that the following are the environmental factors relevant to the proposal:

(a) Declared Rare Flora, Priority flora, and vegetation communities;

(b) Threatened Fauna and Priority fauna;

(c) landform;

(d) groundwater;

(e) dust; and

(f) noise.

The conditions and procedures, in the EPA's opinion, to which the proposal should be subject if implemented are in summary:

(a) the proponent's commitment to prepare and implement an Environmental Management Programme should be made enforceable;

(b) the proponent should be required to implement an environmental management system;

(c) within five years of commissioning the Orebody 18 project, or at such later time considered appropriate, the proponent should be required to prepare and implement a plan which describes the process for the decommissioning and rehabilitation of the project area, provides for the long term management of water quality, and provides for the development of a 'walk away' solution for the decommissioned mine pits, overburden storage areas, the ore processing facilities, and associated infrastructure, including the rail spur; and

(d) the conditions and proponent's commitments should be audited by the Department of Environmental Protection, as appropriate.

The EPA submits the following recommendations:

Recommendation 1

That the Minister for the Environment notes the relevant environmental factors and the EPA's objective for each factor as set out in Section 3 of the report.

Recommendation 2

That subject to satisfactory implementation of the EPA's recommended conditions and procedures as set out in Section 4 of the report, including the proponent's environmental management commitment, the proposal can be managed to meet the EPA's objectives.

Recommendation 3

That the Minister for the Environment imposes the conditions and procedures set out in Section 4 of this report.

Recommendation 4

That the Minister for the Environment notes the Working Group established by the Pilbara Iron Ore Environmental Management Committee to prepare a strategy for addressing the environmental issues related to mining below groundwater and subsequent policy or guidelines for management of such mining, and notes that BHP Iron Ore Pty Ltd should give consideration to the findings of the Working Group in its plans.

Contents

1. Introduction

This report is to provide Environmental Protection Authority (EPA) advice and recommendations to the Minister for the Environment on the environmental factors relevant to the proposal by BHP Iron Ore Pty Ltd (BHPIO) to develop the Orebody 18 iron ore mine on Mineral Lease 244SA, 32 km east of the township of Newman in the Shire of East Pilbara.

The proposal to mine iron ore from Orebody 18 was referred to the EPA in September 1995 and the level of assessment was set at Consultative Environmental Review (CER). The CER report (BHP Iron Ore Pty Ltd, 1996) hereafter called the CER, prepared was made available for public review between 29 July 1996 to 26 August 1996.

Section 3 discusses environmental factors relevant to the proposal.

Conditions and procedures to which the proposal should be subject if the Minister determines that it may be implemented are set out in Section 4. Section 5 presents the EPA's recommendations to the Minister.

Appendix 1 provides maps relating to the proposal. A list of people and organisations that made submissions is included in Appendix 2, and published information is listed in Appendix 3.

2. The proposal

Orebody 18 is located 32 km east of the township of Newman in the Shire of East Pilbara on Mineral Lease 244SA. The location of the mining lease is shown in Appendix 1: Figure 1. The orebody is situated at the eastern end of the Ophthalmia Range. The project involves mining an estimated 116 million tonnes (Mt) of ore at a rate of up to 15 million tonnes per annum (Mtpa) for a mine life of 12 to 15 years. Support infrastructure includes an 8 km rail spur and crushing, screening and load out facilities. Mining will extract hard rock ore from the pit and scree ore from the southern flanks of the hills. A summary of the project characteristics are indicated in Table 1.

Table 1: Summary of project characteristics

Project Aspect	Description*
Mining rate (maximum)	15 Mtpa (dry)
Total production (projected)	116 Mt
Time period	12 - 15 years
Mine pit	163 ha
Maximum depth of pit	120 m
Total overburden (projected)	116 Mt
Area of overburden storage	154 ha
Water requirements	500,000 kL/yr
Power line	32 km in length
Rail spur length	8 km

* Tonnages and areas are estimates based on available drilling data.

A detailed description of the proposal subject of this assessment is described in the proponent's CER report. There were no significant changes to the proposal during the assessment process.

3. Environmental factors

3.1 Relevant environmental factors

In the EPA's opinion, based on the submissions and material listed in Appendices 2 and 3, the following are the environmental factors relevant to the proposal:

(a) Declared Rare Flora, Priority flora, and vegetation communities;

(b) Threatened Fauna and Priority fauna;

(c) landform;

(d) groundwater;

(e) dust; and

(f) noise.

These relevant factors are discussed in Sections 3.2 to 3.7 of this report.

3.2 Declared Rare Flora, Priority flora, and vegetation communities

Aspects of Declared Rare Flora, Priority flora, and vegetation communities

Orebody 18 is situated within the Fortescue Botanical District of the Eremaean Botanical Province, as defined by Beard (1975). The Fortescue Botanical District is characterised by tree and scrub steppes in this area. The District is composed of eight sub-districts of which the Hamersley Plateau sub-district is relevant to this project. Vegetation communities on the Hamersley Plateau range from tree steppes on the ranges, riverine woodlands at the bottom of gorges, mulga (*Acacia aneura*), and spinifex associations on the basalt hills. A description of the flora and vegetation associations within the project area is included in the CER. This description is based upon the findings of a survey programme undertaken by the proponent's consultant. A total of 12 vegetation associations grouped according to their position in the landscape have been identified by the survey. In general, the project area is dominated largely by a tree steppe of low, scattered trees/mallees of *Eucalyptus leucophloia* over an open hummock grassland of *Triodia wiseana*.

Development of the mine pit and overburden storage areas will result in the permanent alteration of approximately 317 ha. Other infrastructure such as road and rail access corridors, borrow pits, stockpile areas and crushing facilities will result in the modification of approximately 130 ha. The project will also result in the removal of three populations of a Priority 2 flora species, *Triumfetta maconochieana* ms.(84 of 424 individuals) identified in the survey area.

Assessment

The area considered for assessment of this relevant environmental factor is the Hamersley Plateau sub-district of the Fortescue Botanical District as defined by Beard (1975). This is a defined ecological region with similarities in climate, land forms, geology, soils and vegetation.

The EPA's objective in regard to this environmental factor is " to protect Declared Rare Flora and Priority flora, consistent with the provisions of the *Wildlife Conservation Act 1950,* and to ensure the abundance, diversity, geographical distribution, productivity of vegetation communities are protected ".

No Declared Rare Flora species have been identified within the Orebody 18 project area.

Within the project area, 84 individuals of the Priority 2 species, *Triumfetta maconochieana* ms. were recorded at sparse densities from three sites. These individuals will be destroyed as a result of the project. As a Priority 2 species, *Triumfetta maconochieana* ms. is designated by

the Department of Conservation and Land Management (CALM) as a taxon which is known from only a few populations, at least some of which are not believed to be under threat (ie: not currently endangered). Additional survey work by BHPIO in the greater Newman area, outside of the project boundaries, identified a further nine populations with 340 individuals. *Triumfetta maconochieana* ms. is also known from other populations in the region, at least one of which is reserved, within the Rudall River National Park. CALM indicates that there appears to be a case for reclassification of this species to Priority 3 and that this will be considered at the next review. Priority 3 species are taxa which are known from several populations, at least some of which are not believed to be under immediate threat.

The EPA considers that the proponent should consider the feasibility of including *Triumfetta maconochieana* ms in rehabilitation of the site. This should be addressed in the Environmental Management Programme for the project.

The vegetation associations of the project area are widespread in the Pilbara with significant representation within conservation reserves, notably the Karijini and Chitchester Range National Parks. There do not appear to be any vegetation associations of regional significance in the project area.

Having particular regard to:

(a) BHPIO's statutory obligations under the *Wildlife Conservation Act 1950*;

(b) Declared Rare Flora species which are unlikely to be affected;

(c) the location of individuals of the Priority 2 species, *Triumfetta maconochieana* ms, outside of the project area and the comments from CALM regarding a case for possible reclassification to Priority 3; and

(d) regionally significant vegetation communities which are unlikely to be affected,

it is the EPA's opinion that the Orebody 18 project is unlikely to compromise its objective to protect Declared Rare Flora, Priority flora and vegetation communities.

3.3 Threatened Fauna and Priority fauna

Aspects of Threatened Fauna and Priority fauna

A description of the fauna likely to be in the project area and its surrounds was presented in the CER. This description was based on a field survey of the four recognised major habitat types and a review of available literature by the proponent's consultants. The presence of the Western Pebble-mound Mouse (*Pseudomys chapmani*) within the Spinifex Steppe habitat was inferred from the presence of active pebble mounds. The Western Pebble-mound Mouse is gazetted as a Schedule 1 Rare and Endangered Fauna species under the *Wildlife Conservation Act 1950* and is also on the Australian and New Zealand Conservation Council (ANZECC) List of Endangered Vertebrate Fauna.

There will be local impacts on fauna of the area as a result of the mining operation. Initially, there will be loss of habitats resulting in the loss of the non-mobile species occupying these sites. Eleven active pebble-mounds of the Western Pebble-mound mouse will be removed by the operations due to their location within or near proposed overburden storage areas and ore stockpile areas.

Assessment

The area considered for assessment of this relevant environmental factor is the Fortescue Botanical Province as defined by Beard (1975). This is a defined ecological region with similarities in climate, land forms, geology, soils and vegetation. Fauna and habitats are closely interrelated with these factors.

The EPA's objective for this environmental factor is to "protect Threatened Fauna and Priority fauna species, and their habitats consistent with the provisions of the *Wildlife Conservation Act 1950* ".

Any protected fauna which may occur within the project site are protected by the requirements of the *Wildlife Conservation Act 1950.*

The impact on Western Pebble-mound mice is considered to be minor given their security and abundance in several National Parks in the Pilbara. Procedures for the management of the Western Pebble-mound mouse will be developed in consultation with CALM. Approval from CALM is required for BHPIO to remove the mice. Mice from any mounds that require disturbance will be either relocated or included in research programmes in consultation with CALM.

Widely dispersing fauna species such as the larger macropods and most birds are unlikely to be significantly affected by the proposal. Poorly dispersing fauna such as smaller marsupials and reptiles lost due to destruction of habitat have the potential to recolonise rehabilitated sites if appropriate habitats are re-created. The proponent has indicated that impacts on fauna will be minimised by staged clearing, limiting clearing to that which is absolutely essential, and limiting road and track development. Details of fauna management will be addressed in an Environmental Management Programme (Commitment 1).

Having particular regard to:

(a) BHPIO's statutory obligations under the *Wildlife Conservation Act 1950*;

(b) the arrangements for management of Schedule 1 fauna (the Western Pebble-mound mouse);

(c) the representation of fauna species and similar habitat elsewhere in the region, including within the conservation estate;

(d) the Environmental Management Programme, which in particular includes the management of the Western Pebble-mound mouse; and

(e) that the return of fauna species to rehabilitated areas will be promoted through creation of habitat and other management practices,

it is the EPA's opinion that the Orebody 18 project is unlikely to significantly affect Threatened Fauna, and Priority fauna species and habitat.

3.4 Landform

Aspects of Landform

The Orebody 18 deposit lies on the eastern end of Ophthalmia Range, some 32 km east of the town of Newman. The four main landform units within the project area described in the CER are:

- Ridges and Hills - high ridges and hills rising above the surrounding plains. The surface is largely covered with skeletal soils with areas of exposed rock;
- Gorges - exposed rock gorges with steep sides, the beds of which are filled with boulders, gravels and sand;
- Scree Slopes - gravely loams with pockets of skeletal soil and stones on slopes of 12^{o} - 15^{o}, elevation to 40 m and undulating; and
- Outwash Plains - flat plains of deep loams or clayey soils with associated drainage lines.

The proposal involves the mining of 116 Mt of iron ore, the removal and storage of 116 Mt of overburden, the development of a rail spur, borrow pits and infrastructure. Mining will be by

conventional open cut methods and will extract hard rock ore from the pit and scree ore from the southern flanks of the hills. Recovery of the ore will result in a pit approximately 4 km in length with a width of 200 - 500 metres and extending up to 120 m below existing ground level at its deepest point. The majority (94 Mt) of overburden will be placed in a storage area on the plain to the east of the pit, approximately 5 Mt will be placed in an area on the plain to the south west of the pit and the remainder, approximately 17 Mt, will be placed in a gully north-west of the pit.

Assessment

The area considered for assessment of this relevant environmental factor, landform, is that part of Ophthalmia Range where the Orebody 18 project is located and the proposal dump site(s). This is the area where the existing landform will be affected by the proposal.

The EPA's objective in regard to this environmental factor is to integrate, as far as practicable, the post-mining landform with the surrounding environment.

The creation of a void is an inevitable consequence of mining Orebody 18 as approximately half of the material excavated is ultimately transported off-site as product. Open cut mining at Orebody 18 requires overburden to be removed in order to access the ore. For Orebody 18 the majority of overburden will be stored outside of the pit. BHPIO indicates that there are no firm plans detailing overburden return to the pit. The location selected for storage of overburden is influenced by a number of considerations including access, haulage distance, landform impact and disturbance to flora, fauna and archaeological sites.

The EPA notes the final landform criteria which have been outlined by the proponent for various elements of the project and considers that matters relating to landform can be managed through implementation of the practices described in the proponent's Environmental Management Programme (Commitment 1). It is anticipated that the proposed EMP will address landform in its consideration of the following:

- surrounding environment;
- overburden storage;
- groundwater; and
- rehabilitation.

Having particular regard to:

(a) the fact that a mined out void and storage of overburden is an inevitable consequence of open cut mining; and

(b) that an Environmental Management Programme, which in particular includes management practices to reduce final landform impacts, will be prepared and implemented,

it is the EPA's opinion that the Orebody 18 project is unlikely to compromise its objective to integrate, as far as practicable, the post mining landform with the surrounding environment.

3.5 Groundwater

Aspects of groundwater

As described in the CER, the hydrogeology of the Orebody 18 environs was investigated in late 1995 and early 1996 by drilling and aquifer testing. The orebody itself is 'cradled' in the Shovellanna Syncline (which plunges west-northwest) and, in the immediate area of Orebody 18, is bounded by the Mt McRae and Mt Sylvia shale units to the north, east and south but is "open" to the west (WNW). The Shovellanna Syncline is one of many fold structures on the generally northerly dipping limb of a regional monocline type structure. To the north and

northwest of the mine area the orebody aquifer system is bounded by steeply dipping shales and banded iron formations of the Weeli Wolli Formation. Underlying these units are Wittenoom Formation and the Marra Mamba Iron Formation. In summary, the groundwater system can be broadly grouped into 5 units as follows:

- an aquifer formed by Orebody 18 which includes the ore below the water table;
- an aquitard (low permeability unit/hydraulic barrier) formed by the Mt McRae and Mt Sylvia shale units;
- an aquifer formed by fractured banded iron formation and chert basement in the lower Sylvia and along the eroded top edge of the Wittenoom Formation;
- the shallow alluvial aquifer formed by scree and alluvial clay deposits which contain minor calcrete developed below the water table; and
- an aquifer formed by the mineralisation and fractured unmineralised Marra Mamba Iron Formation.

Hydraulic testing of selected shale intervals within the Mt McRae and Mt Sylvia shale units (immediately below the orebody, stratigraphically) indicates these units have a low hydraulic conductivity (permeability), with estimates ranging from 10^{-3} to 10^{-2} m/d. The CER suggests that the Mt McRae and Mt Sylvia units form an aquitard/hydraulic barrier between the orebody aquifer and other local groundwater systems, except to the west-northwest where mineralised Dales Gorge Member is expected to be extensive. Water level monitoring suggests that the groundwater level within the orebody aquifer is higher (perched) than in the adjacent shales.

An estimated 4.8 Mt of high grade ore requiring the total movement of 5.4 Mt (ore plus overburden) occur below the watertable level and will require dewatering to enable mining. Approximately 8 ha of the 163 ha pit will require dewatering and this water will be used as process water, with any excess released to the environment. The orebody aquifer is relatively fresh with a salinity level of 580 mg/L TDS. The orebody aquifer occurs at about 495 m AHD and dewatering will be required to at least 43 m below the water table to a minimum RL of 452 m AHD. On decommissioning BHPIO expects that pit water levels will rise until a balance is reached between evaporative losses and groundwater inflows but that overall the pit will remain a groundwater sink, with evaporative losses maintaining pit water levels below the pre-mining level of the groundwater table. As a result of the pit acting as a groundwater sink, BHPIO expects that evaporation will cause the water to become increasingly saline.

The Water and Rivers Commission (WRC) submission indicated that the project is likely to have an acceptable impact on the environmental and social values of local water resources. Additional advice from the WRC indicates that the salinization of the water in the mined-out pit is unlikely to have a significant effect on regional groundwater resources. The potential for infilling the pit and the subsequent removal of the possible salt water lake was discussed with BHPIO. Advice from BHPIO on this matter indicates that there are currently no firm plans detailing overburden return to the pit, however, the company has indicated in response to submissions that it will make every endeavour to directly infill overburden, wherever practicable. The proposed rehabilitation criteria indicated in the CER does note that the opportunity for filling the pit with overburden below the watertable will be reconsidered by BHPIO when its Environmental Management Programme is reviewed with the DEP in the future.

Pyritic shales occur embedded within a geological formation known as the Mount McRae Shale band. This potentially acid-producing pyritic material occurs at depths of between 6 and 40 m below the proposed mine pit floor. As a result of its depth, the pyritic material will not be intercepted by the pit. As dewatering will not occur below the level at which the Mt McRae Shale occurs, the pyritic shales within it should not be disturbed or exposed to oxygen, avoiding the potential for acid production.

The current assessment of potential impacts and the principles influencing the hydrogeology of the Orebody 18 project are based on available data and modelling. The and is regarded as indicative of what may be expected.

Assessment

The area considered for assessment of this relevant factor, groundwater, is the orebody aquifer, as this is the water resource that could be affected by salinization of the water body which forms in the mined-out pit.

The EPA's objective for this environmental factor is to ensure that dewatering does not significantly affect phreatophytic vegetation or other users, and that mining does not degrade the quality of the regional groundwater resources.

The EPA notes from the CER that during the operation phase of the project, dewatering is expected to induce flows from the adjacent orebody aquifer towards the mine with only minor flows from adjacent valley sediments and basement aquifers due to the low hydraulic conductivity (permeability) of intervening geological units. The EPA accepts that these surrounding aquifers are around 50 m or more below surface level and do not support phreatophytic vegetation or provide water for pastoral use and consequently if any drawdown does occur in these aquifers is unlikely to be environmentally significant for existing uses.

The EPA notes that the dewatering discharge quality is relatively fresh and that for water extraction and discharges BHPIO are required to comply with the *Water and Rivers Commission Act, 1995*, the *Rights in Water and Irrigation Act, 1914* and Part V of the *Environmental Protection Act, 1986.*

The EPA notes that modelling of the water in the decommissioned pit suggests that the pit will remain a sink. Equilibrium will be maintained as the inflow from the groundwater balances the outflow of evaporation. As a result it is likely that the pit water will become increasingly saline. The EPA notes that the saline water is not expected to migrate from the pit until its salinity exceeds 10,000 mg/L TDS. Furthermore, the CER indicates that any saline water that does migrate from the pit is expected to be restricted to the orebody aquifer and have little or no impact on the valley sediments and/or other aquifers.

The EPA notes that the WRC and DEP indicated a preference to have the pit backfilled to the extent that no exposed water body remains following rehabilitation in order to avoid long term potential for salinization problems.

The EPA understands that the Government approach to mining below water table in the Pilbara is being co-ordinated through the Pilbara Iron Ore Environmental Management Committee (PIEC), chaired by the Department of Resources Development. This is an interdepartmental committee with the objective of co-ordinating and reviewing environmental management of the Pilbara iron ore industry with an emphasis on rehabilitation performance. In September 1995, the Minister for Resources Development received support from the Ministers for Mines, Water Resources and the Environment for the PIEC to establish a working group to focus specifically on the issue of mining below the water table. The role of the Working Group set up by the PIEC is to prepare a strategy for addressing the environmental issues related to mining below groundwater, and to prepare subsequent policy or guidelines for management. The EPA considers the proponent should consider any such policy or guidelines for mining below the groundwater developed by the Working Group.

The EPA considers that the water forming in the mined-out pit is unlikely to have a significant affect on adjacent aquifers.

Having particular regard to:

(a) BHP's statutory obligations under the *Water and Rivers Commission Act, 1995*, the *Rights in Water and Irrigation Act, 1914* and Part V of the *Environmental Protection Act, 1986* in regard to groundwater abstraction and dewatering;

(b) that there is no existing environmental dependence on the orebody aquifer;

(c) the expectation that water forming in the mined out pit will predominantly act as a groundwater sink; and

(d) the expectation that any plume of saline water migrating from the mined out pit will not affect adjacent aquifers,

it is the EPA's opinion that the project can be managed to meet its objective in regard to groundwater.

3.6 Dust

Aspects of dust

The generation of dust from open-cut iron ore mining can occur when large volumes of dry materials are moved. Activities which have the potential to generate dust are presented in the CER.

Assessment

The area considered for assessment of this relevant factor, dust, is the area within a radius of 30 km from the minesite, which includes the nearest residence. This is the area that dust levels must be controlled to meet the ambient air quality guideline of 1 000 $\mu g/m^3$ (15 minute average) and ambient air quality standard of 90 $\mu g/m^3$ (24 hour average).

The EPA's objective in regard to this environmental factor is to "ensure that the dust levels generated by the proposal meet statutory requirements and acceptable standards".

The nearest residence to Orebody 18 is Sylvania Station, located 30 km to the south and the EPA accepts that the residence is unlikely to be affected by any dust generated by the project activities. The public recreation area at Ophthalmia Dam is 15 km away and similarly, the EPA accepts that this area is unlikely to be affected by any dust generated by the project activities.

Dust management measures will be included in the Environmental Management Programme to be prepared by the proponent to the satisfaction of the EPA (Commitment 1). Dust associated with processing facilities would also be addressed within the Department of Environmental Protection's works approval and licensing provisions under the *Environmental Protection Act* (1986).

Having particular regard to:

(a) the distance from the minesite to the nearest residence;

(b) the proposed Environmental Management Programme to be prepared and implemented that will include management practices regarding dust; and

(c) the pollution control provisions of the *Environmental Protection Act* (1986) to control dust should a problem arise,

it is the EPA's opinion that its objective for dust is unlikely to be compromised by the proposal.

3.7 Noise

Aspects of noise

Noise will be generated during construction by earthmoving equipment and plant assembly activities. Noise will originate during mine operation from blasting, earthmoving equipment, the processing plant and the rail load-out facility.

Assessment

The area considered for assessment of this relevant factor, noise, is the area within a radius of 30 km from the minesite which includes the nearest residence. This is the area that noise levels must be managed to meet statutory requirements and acceptable standards.

The EPA's objective in regard to this environmental factor is to "ensure that the noise levels generated by the proposal meet statutory requirements and acceptable standards".

The nearest residence to Orebody 18 is Sylvania Station, located 30 km to the south and the EPA accepts that the noise emissions at the residence will comply with the Noise Abatement (Neighbourhood Annoyance) Regulations 1979. In regard to occupational health of the workforce, the requirements of the Mine Safety and Inspection Regulations 1979 for the protection of workers will also be complied with.

Noise management measures will be included in the Environmental Management Programme to be prepared by the proponent to the satisfaction of the EPA (Commitment 1).

Having particular regard to:

(a) the distance from the minesite to the nearest residence;

(b) the proposed Environmental Management Programme to be prepared and implemented that will include management practices regarding noise; and

(c) BHP's statutory obligations under the *Noise Abatement (Neighbourhood Annoyance) Regulations 1979* and the *Mine Safety and Inspection Regulations 1995* ,

it is the EPA's opinion that noise from the Orebody 18 project is unlikely to significantly affect surrounding land users.

4. Conditions and procedures

In the EPA's opinion, the proposal should be subject to the following conditions and procedures if implemented:

4.1 Proponent commitments

The proponent's commitment to prepare and implement an Environmental Management Programme set out in the CER should be made an enforceable condition. The Environmental Management Programme should be to the requirements of the EPA on advice of the DEP, DRD, DME and WRC.

4.2 Environmental Management System

The proponent should be required to prepare and implement an environmental management plan and environmental management procedures in order to implement the proposals and manage the relevant environmental factors to ensure the EPA's objectives (Section 3) are met. The plan should adopt quality assurance principles (such as those adopted in Australian Standards ISO 9000 series) and environmental management principles (such as those adopted in the voluntary Australian Standards ISO 14000 [draft] series), with appropriate monitoring and auditing to ensure compliance with this condition.

The EPA understands that an Environmental Management System developed for BHP Minerals applies to BHP Iron Ore and to the development proposed at Orebody 18.

4.3 Decommissioning and rehabilitation

Within five years of commissioning the Orebody 18 project, or at such later time considered appropriate, the proponent should be required to prepare and implement a plan which describes the process for the decommissioning and rehabilitation of the project area, provides for the long term management of water quality, and provides for the development of a 'walk away' solution for the decommissioned mine pits, overburden storage areas, the ore processing facilities, and associated infrastructure, including the rail spur.

4.4 Procedures

The conditions and proponent's commitments should be audited by the DEP, as appropriate.

5. Recommendations

The EPA submits the following recommendations:

Recommendation 1

That the Minister for the Environment notes the relevant environmental factors and the EPA's objective set for each factor as set out in Section 3 of the report.

Recommendation 2

That subject to satisfactory implementation of the EPA's recommended conditions and procedures of Section 4 of the report, including the proponent's environmental management commitment, the proposal can be managed to meet the EPA's objectives.

Recommendation 3

That the Minister for the Environment imposes the conditions and procedures set out in Section 4 of this report.

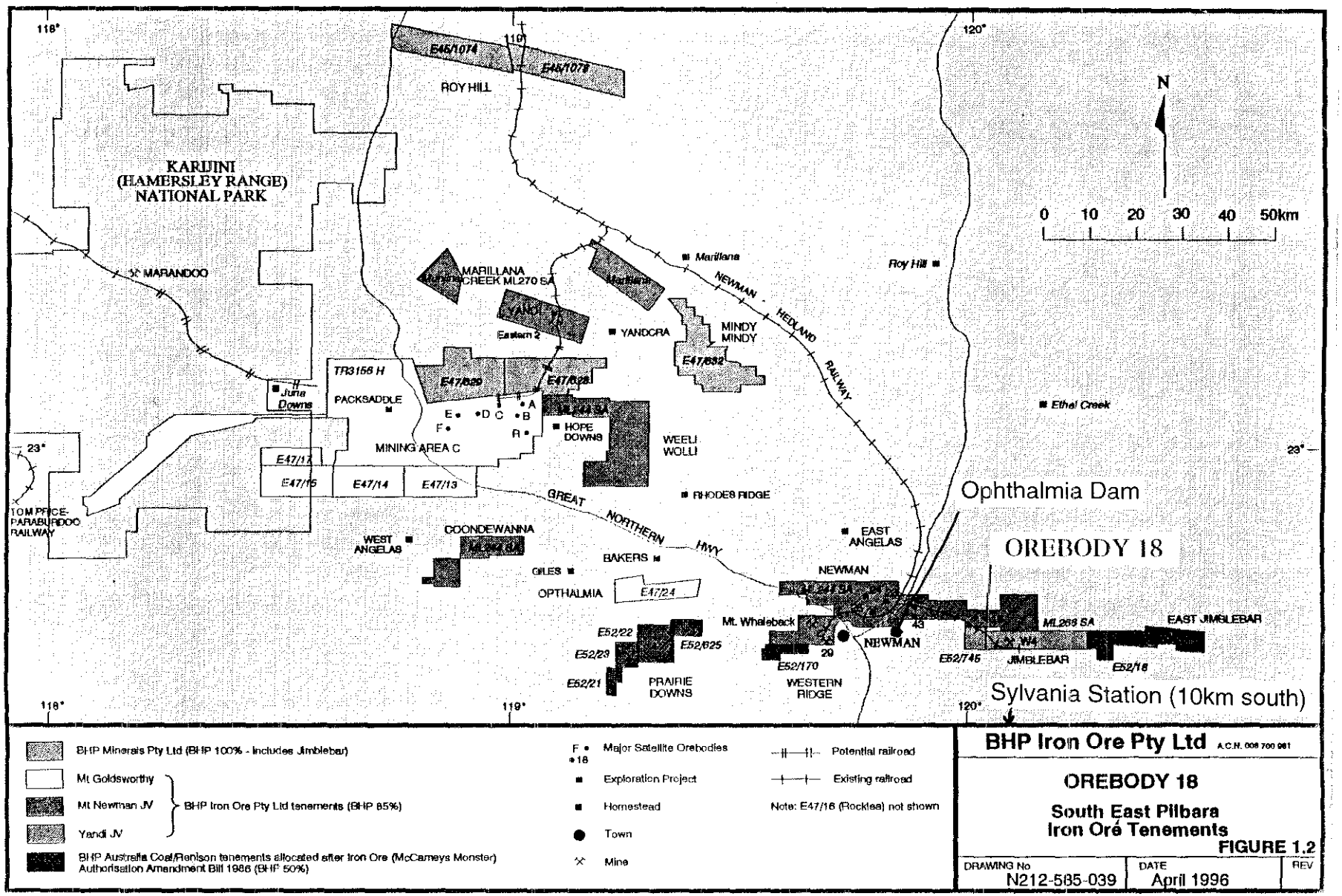
Recommendation 4

That the Minister for the Environment notes the Working Group established by the Pilbara Iron Ore Environmental Management Committee to prepare a strategy for addressing the environmental issues related to mining below groundwater and subsequent policy or guidelines for management of such mining, and notes that BHP Iron Ore Pty Ltd should give consideration to the findings of the Working Group in its plans.

Table 2. Relevant environmental factors, objectives, proponent's commitments and EPA's opinion

relevant factors	objective	proponent's commitment	EPA's opinion
1. Declared Rare Flora, Priority flora, and vegetation communities.	To protect Declared Rare Flora and Priority flora, consistent with the provisions of the *Wildlife Conservation Act 1950,* and to ensure the abundance, diversity, geographical distribution, productivity of vegetation communities are protected.	Prepare and implement an Environmental Management Programme to the satisfaction of the EPA.	The project is unlikely to compromise the EPA's objective to protect Declared Rare Flora, Priority flora, and vegetation communities.
2. Threatened Fauna and Priority fauna	To protect Threatened Fauna and Priority fauna species, and their habitats consistent with the provisions of the *Wildlife Conservation Act 1950.*	Prepare and implement an Environmental Management Programme to the satisfaction of the EPA.	The project is unlikely to significantly affect Threatened Fauna and Priority fauna species, and habitat.
3. Landform.	To integrate, as far as practicable, the post mining landform with the surrounding environment.	Prepare and implement an Environmental Management Programme to the satisfaction of the EPA.	The project is unlikely to compromise the EPA's objective to integrate, as far as practicable, the post mining landform with the surrounding environment.
4. Groundwater	To ensure that dewatering does not significantly affect phreatophytic vegetation or other users, and that mining does not degrade the quality of the regional groundwater resources.	Prepare and implement an Environmental Management Programme to the satisfaction of the EPA.	The project can be managed to meet the EPA's objective to reduce short term effects and to protect the environment from significant impacts resulting from decommissioning.
5. Dust.	To ensure that the dust levels generated by the proposal meet statutory requirements and acceptable standards.	Prepare and implement an Environmental Management Programme to the satisfaction of the EPA..	Dust resulting from the Orebody 18 project is unlikely to significantly affect surrounding land users.
6. Noise	To ensure that the noise levels generated by the proposal meet statutory requirements and acceptable standards.	Prepare and implement an Environmental Management Programme to the satisfaction of the EPA.	Noise from the Orebody 18 project is unlikely to significantly affect surrounding land users.

Figure 1. Location map.



Appendix 2

List of people and organisations that made submissions

Aboriginal Affairs Department, Perth
Aboriginal Affairs Department, Pilbara Regional Office
CSIRO
Department of Conservation and Land Management
Department of Minerals and Energy
Department of Resources Development
Water and Rivers Commission
Water Corporation

Appendix 3

References

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