

**Boddington and Hedges Gold Mines,
Boddington Expansion, Shire of Boddington,
Change to Environmental Conditions
and
Gas-Fired Power Station and Natural Gas Pipeline,
12 km Northwest of Boddington**

Worsley Alumina Pty Ltd / Alcoa of Australia Ltd

and

Worsley Alumina Pty Ltd

**Section 46 Report and Recommendations
of the Environmental Protection Authority**

and

**Report and Recommendations
of the Environmental Protection Authority**

**Environmental Protection Authority
Perth, Western Australia
Bulletin 1035
December 2001**

ISBN. 0 7307 666 16

ISSN. 1030 - 0120

Assessment Nos [1408](#), [1409](#), & [1410](#)

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1. Introduction

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment and Heritage on the environmental factors relevant to two proposals at the Boddington and Hedges Gold Mines.

The first is a proposal by Worsley Alumina Pty Ltd to develop a gas-fired power station and natural gas pipeline, to provide power for an expanded mining proposal. This proposal is being assessed as a proponent initiated Environmental Protection Statement (EPS).

The second is the proposed expansion of the Boddington and Hedges Gold Mine by Worsley Alumina Pty Ltd. This proposal is being assessed by the EPA under Section 46 of the *Environmental Protection Act 1986* as it requires changes to the existing environmental conditions of the Boddington and Hedges Gold Mine. In addition to the changes necessary as a result of the proposed expansion, the EPA has also been requested to review the current conditions and amend them to reflect changes in ownership of the mining area since the last approvals were given.

Due to the close nature of these two proposals the EPA has chosen to report to the Minister for the Environment and Heritage within a single document (this Bulletin). Both proposals have been developed together, and in particular, the proponents' public consultation process has included both proposals throughout. In addition, both proposals are presented in a single environmental review document (WEC, 2001).

EPS assessment – on-site power station

The EPA was advised of the proposal in November 2001. Based on the information provided, the EPA considered that while the proposal had the potential to have an effect on the environment, the proposal could be readily managed to meet the EPA's environmental objectives. Consequently it was notified in *The West Australian* newspaper on 3 December 2001 that, subject to preparation of a suitable Environmental Protection Statement (EPS) document, the EPA intended to set the level of assessment at EPS.

The proponent has prepared the EPS which accompanies this report (WEC, 2001). The EPA considers that the proposal described can be managed in an acceptable manner subject to the commitments to the proposal being legally binding.

The EPA therefore has determined under Section 40 (1) that the level of assessment for the proposal is EPS, and this report provides the EPA advice and recommendations in accordance with Section 44 (1).

Section 46 assessment – Boddington Expansion

The Boddington and Hedges gold mines are located on a single ore-body that happens to be divided by a mining tenement boundary (Figure 2). As a result, two separate projects have been developed by the two mining tenement holders.

The Boddington Gold Mine operated by Worsley Alumina Pty Ltd was initially evaluated by the EPA in 1985 (EPA, 1985). Since that time a number of modifications and expansions have been assessed by the EPA and approved by the Minister for the Environment. The most

recent assessment in 1997 was for an extended basement operation (EPA, 1997a). As a result of this history, there are currently two sets of environmental conditions (Statements 453 and 489, Figure 4) that apply to this mine and are being audited by the Department of Environmental Protection.

The Hedges Gold Project was initially proposed by Alcoa of Australia Ltd and assessed in 1987-8 at the level of an Environmental Review and Management Programme (EPA, 1987), and subsequently approved. An increase to the throughput was assessed by the EPA in 1997 and also approved via changes to the environmental conditions (EPA, 1997b). As a result, the Hedges Gold Project is currently subject to one set of environmental conditions (Statement 450, Figure 4).

The two projects were operated as separate mining and processing facilities until 1998 when the Boddington Gold Mine Joint Venturers acquired the Hedges mining tenements. Since that time, mining operations associated with both projects have been carried out by Worsley Alumina Pty Ltd. Alcoa of Australia Ltd has recently commenced decommissioning works on its remaining land including the gold mining processing and tailings facilities.

2. The proposal

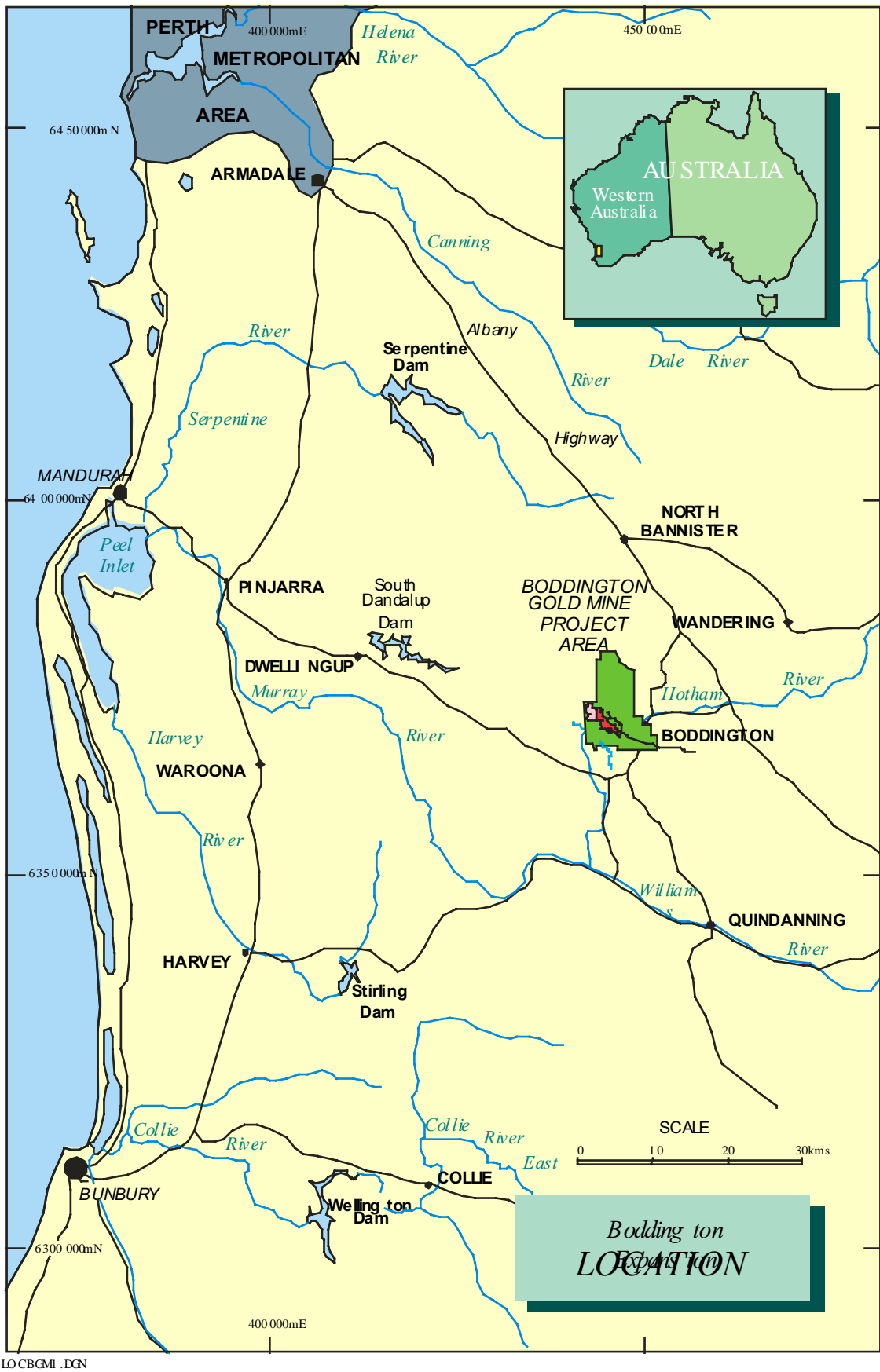
EPS assessment – on-site power station

The proposal is described in detail in Part III of the proponent's environmental review document (WEC, 2001). The proposal involves the development of a 110 megawatt power station at the Boddington Gold Mine (Figure 1) to provide electrical power to the Boddington Expansion proposal. The power station would be fuelled by a natural gas pipeline from Pinjarra to the mine-site (Figure 3).

The main characteristics of the proposal are summarised in Table 1 below.

Table 1. Key Characteristics of on-site power station

Element	Quantities/Description
Life of project	Life of Boddington Expansion
Power station	
Capacity	110 megawatts
Fuel	Gas
Cooling water	
consumption	About 2400 megalitres per annum
source	existing D1 or D4 water supply reservoir
Plant	Two gas turbines Two waste heat boilers One steam turbine Reverse osmosis water treatment plant Two 20 metre stacks and two bypass stacks
Air emissions	
Nitrogen oxides	4.6 grams per second
Greenhouse gases (CO ₂)	360,000 tonnes per year at 95% of capacity
Gas pipeline	
Vegetation disturbance	Approximately 30.5 hectares
Length and diameter	65 kilometres, 210 millimetres outside diameter
Pressure	4.9 megapascals
Alignment	Principally along the rail reserve (between Boddington and Pinjarra)



LOCBGM1.DGN

Figure 1 Location of the Boddington and Hedges Gold Mines (Source: WEC, 2001)

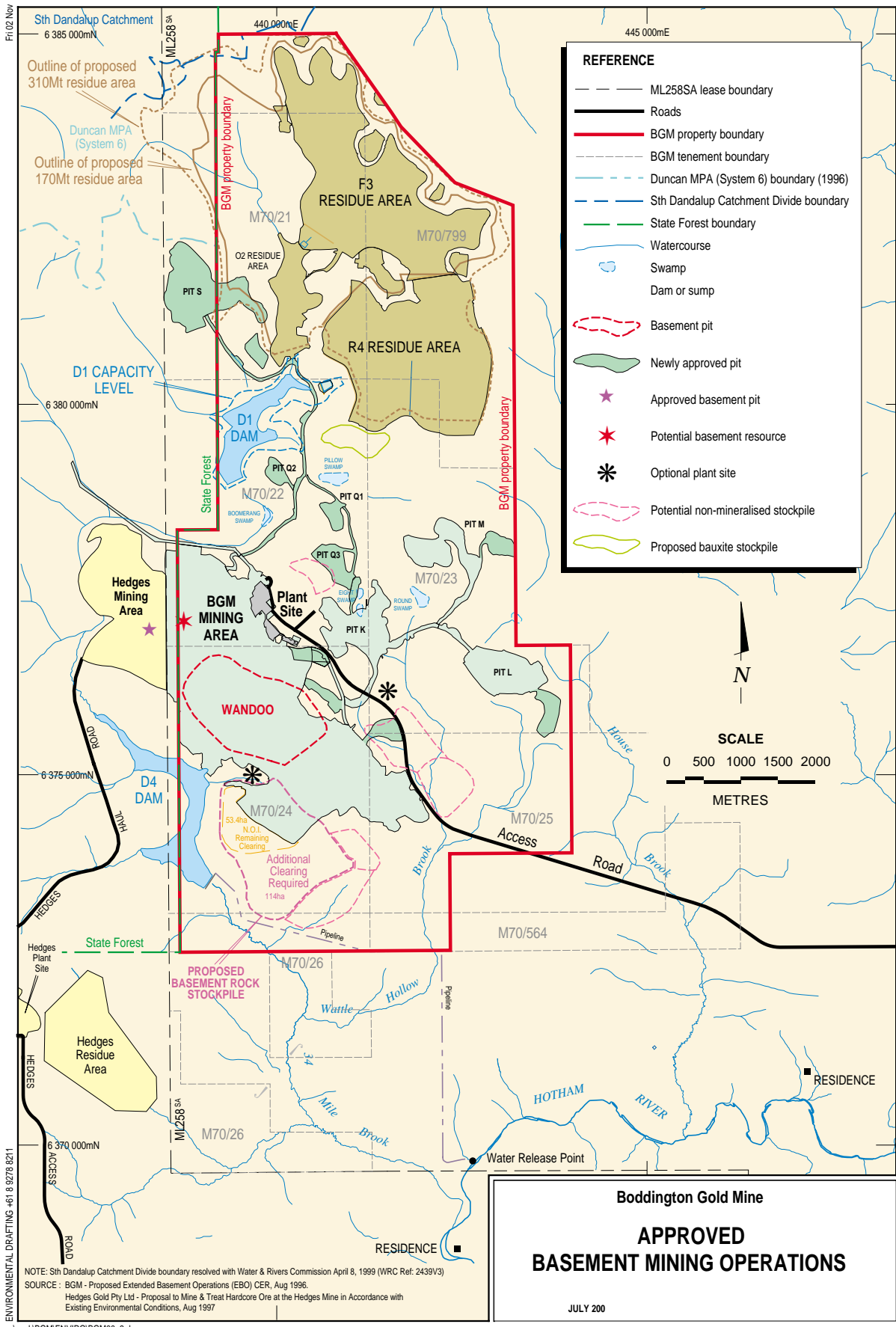


Figure 2 Project Layout (Source: WEC, 2001)

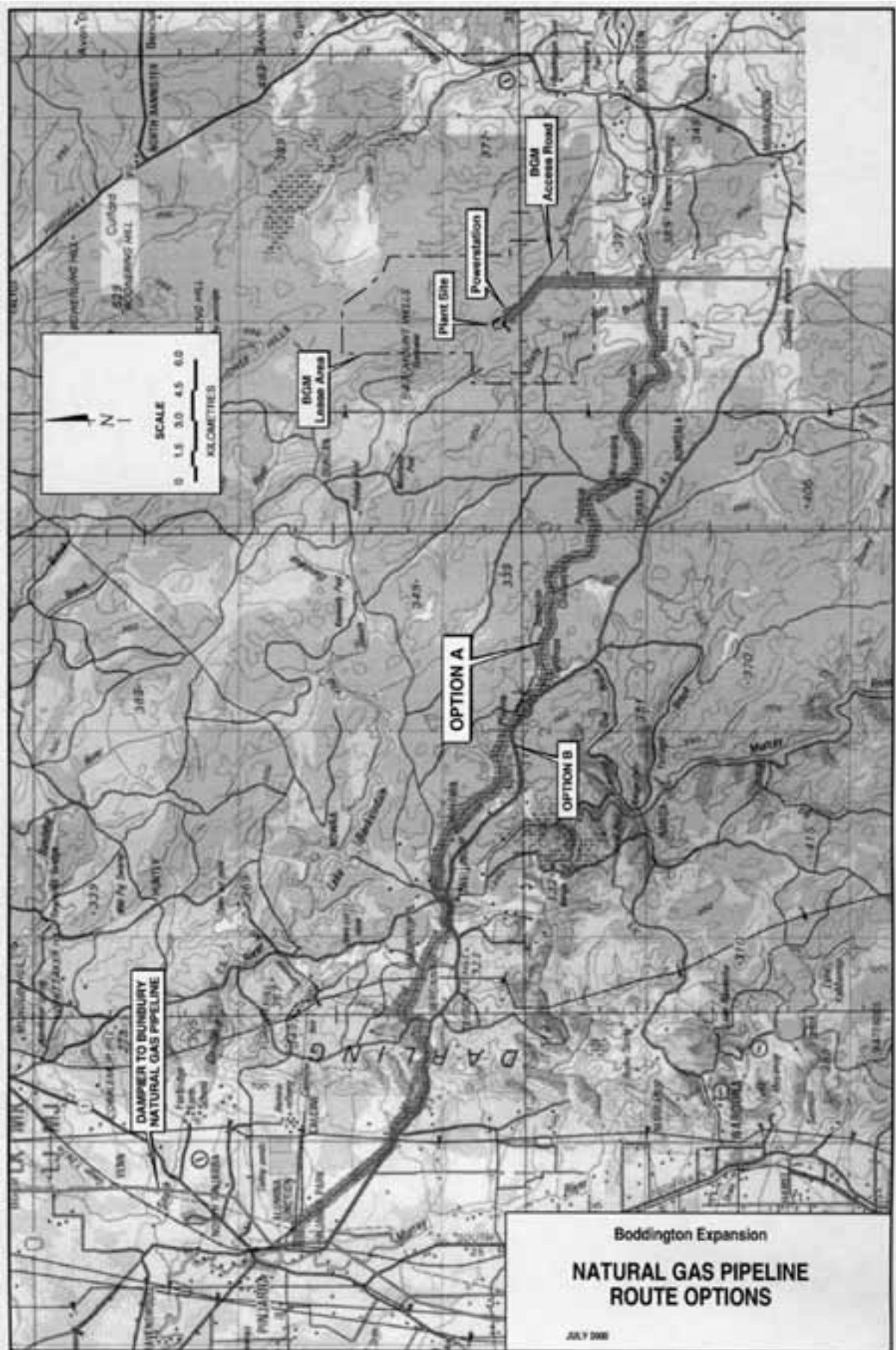


Figure 3 Natural Gas Pipeline Route (Source: WEC, 2001)

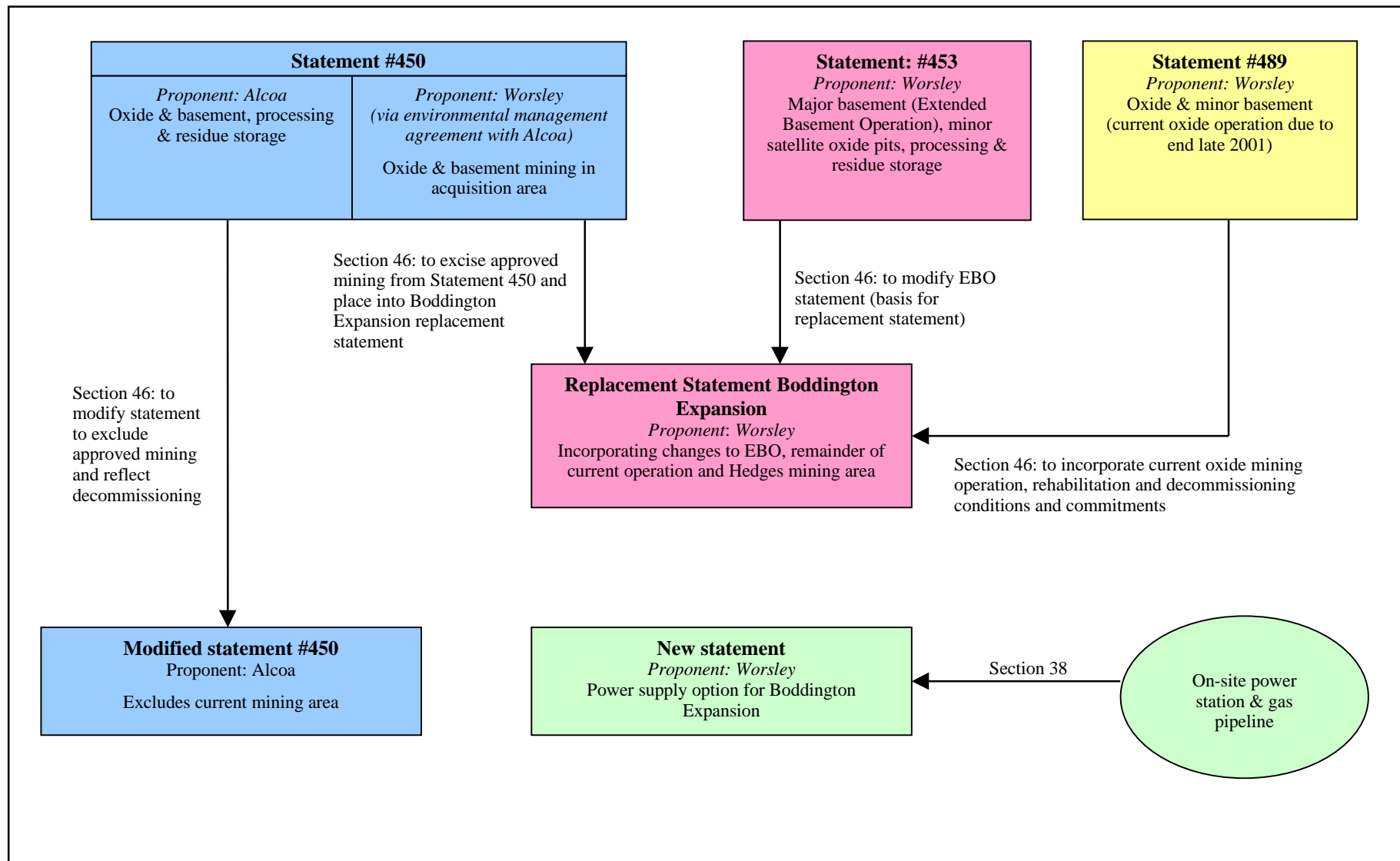


Figure 3 Rationalisation of Ministerial Statements (Source: WEC, 2001)

Section 46 assessment – Boddington expansion

The proposal is described in detail in Part II of the proponent’s environmental review document (WEC, 2001). The Boddington Expansion incorporates the following changes to the currently approved proposals (refer to Figure 2):

- throughput up to 29 million tonnes per annum;
- installation of a sulphidisation, acidification, recycling, and thickening (SART) process to recover copper and cyanide from cyanide leach solutions;
- reduction of weak acid dissociable cyanide in the D1 water supply reservoir from 50 milligrams per litre to below 5 milligrams per litre;
- permanent diversion of a small section of Thirty-four Mile Brook;
- development of non-mineralised rock dump in the valley of D4 water supply reservoir;
- development of two mine pits;
- backfilling of one existing mine pit;
- no significant change in the overall area of native vegetation cleared, but proportionally more clearing in State Forest;
- option of using electricity from an on-site gas turbine power station; and
- two options for exchange of land of comparable conservation value for land to be affected by the approved residue disposal area expansion.

Table 2 summarises the key project characteristics of the currently approved project and proposed extension.

Table 2. Key characteristics of Boddington Expansion

Element	Boddington Gold Mine Project with changes ¹	Changes arising from Boddington Expansion ²
MINING		
Life of mine	Basement mining for a period up to 15-20 years. Oxide mining complete in 2001	Potential increased mine life of up to 7 years
Open cut mining	Mainly basement ores and some oxide ores	No change
	Two basement open cuts down to approximately –125 mAHD	No change
Stockpiles and associated drainage systems		
	Bauxite stockpile (about 24 hectares of clearing)	No change
	Non-mineralised stockpiles (about a total of 278 hectare of clearing)	About 30 hectare reduction in clearing. Different locations and footprint
Backfilling	Back filling of existing Wandoo North pit to above normal surface level	Backfilling of one open cut to above normal surface level
Thirty-four Mile Brook	Diversion of natural and previously diverted channel and construction of D4 WSR bypass in State Forest	Diversion of natural and previously diverted channel and construction of D4 WSR bypass in State Forest

¹ Boddington Gold Mine Project includes the Boddington Expansion and current operations at BGM and the Hedges acquisition area.

² Changes to existing approved proposals at BGM and in the Hedges acquisition area arising from the Boddington Expansion.

Element	Boddington Gold Mine Project with changes ¹	Changes arising from Boddington Expansion ²
PROCESSING		
Basement and oxide crushing and milling		
Power source	Western Power grid or on-site natural gas fired power station	Option for on-site generation of electricity from natural gas-fired power station.
Throughput	Up to 29 million tonnes per annum	Increase of 9.8 million tonnes per annum
Facilities	Three crushers	No change
	Three grinding rolls	New plant
	Ore conveyors	No change
	Three ball mills	No change
	Fifteen flotation cells	Seven additional cells
	Four thickeners	No change
	SART cyanide recovery plant to reduce cyanide concentration in decant pond to less than 50mg/L	New plant
VEGETATION DISTURBANCE	3400 hectares	No significant change in overall amount of clearing but proportionally more clearing in State Forest.
RESOURCE CONSUMPTION		
Water	Up to 34 megalitres per day	Increase of about 11 megalitres per day
Electrical energy	About 830,000 megawatt hours per annum	Increase of about 183,000 megawatt hours
Cyanide (30% solution)	Up to 47,000 tonnes per annum	Increase of about 4400 tonnes per annum
Lime	Up to 15,000 tonnes per annum	Increase of about 3500 tonnes per annum
Caustic	Up to 10,000 tonnes per annum	Increase of about 7600 tonnes per annum
Hydrochloric acid	Up to 2200 tonnes per annum	Increase of about 1100 tonnes per annum
Sulphuric acid	Up to 4200 tonnes per annum	Increase of about 4200 tonnes per annum
Sodium hydrosulphide	Up to 1500 tonnes per annum	Increase of about 1500 tonnes per annum
Xanthates	Up to 595 tonnes per annum	Increase of about 249 tonnes per annum
Frother	Up to 580 tonnes per annum	Increase of about 580 tonnes per annum
Flocculant	Up to 313 tonnes per annum	Increase of about 67 tonnes per annum
Storage of raw materials		
Lime	Up to 300 tonnes	No change
Cyanide	Up to 3100 kilolitres	New storage
Caustic	Up to 400 kilolitres	No change
Hydrochloric acid	Up to 60 kilolitres	No change
Sulphuric acid	Up to 70 kilolitres	No change
Sodium hydrosulphide	Up to 110 tonnes	New storage
	Storage and mixing areas on-site	Increased storage capacities
WATER STORAGE RESERVOIRS		
D1 WSR	Capacity up to 13000 megalitres	No change
	Stormwater surge storage	Change from residue decant to stormwater storage from residue disposal areas.
D4 WSR	Storage capacity reducing to about 1400 megalitres	Reduce to 1400 megalitres storage
WATER SUPPLY		
Mine dewatering	Stored in WSRs for use in processing	No change
Thirty-four Mile Brook catchment	Catchment run-off above D4 WSR directed to D4 WSR	Option to discharge below D4 WSR
Hotham River via pipeline	Abstraction of up to 3.3 megalitres per hour and storage in WSRs	Volume required decreases for basement mining

Element	Boddington Gold Mine Project with changes¹	Changes arising from Boddington Expansion²
RESIDUE DISPOSAL	Up to 29 million tonnes per annum up to 63% solids (oxide residue up to 35% solids)	Higher solids content for basement residue
	Residue disposal area capacity up to 310 million tonnes	No change
	Decant on residue disposal area	Decant not stored in D1 WSR
Other		
Excess water discharge	Up to 9600 megalitres per annum	Discharge of excess water is likely to be less but has not been defined in detail.
BGM camp	Expansion of facilities to cater for construction workforce	Construction of additional facilities involving some clearing of vegetation
Truck movements (weekly)	Up to 310	Increase of about 136 movements
Product	Gold metal and copper concentrate	No change
Exchange of land with comparable conservation value.	Options for exchange of up to 1365 hectares of land affected by residue disposal and all State Forest areas within project area	Option for land exchange of all State forest in BGM project area.

In addition to the above physical changes, amendments are proposed to the conditions of approval for the Boddington and Hedges Gold Mines to reflect the acquisition of the Hedges mining tenements and the decommissioning of the remainder of the Hedges site. The intention of this rationalisation (depicted schematically in Figure 4) is to have a clear separation of responsibilities of the two proponents and to have a single set of conditions apply to future mining operations. A table detailing the transfer of environmental requirements from the existing statements to the new draft statements is provided in Appendix 1 of the proponent's environmental review document (WEC, 2001).

3. Consultation

During the preparation of the environmental review document, the proponent has undertaken consultation with government agencies and companies with a direct interest in the project and other key stakeholders.

The stakeholders identified by the proponent were:

- Landowners along the Hotham River and access road.
- General community of the Shire of Boddington and Dwellingup.
- Councillors and staff from the Shires of Boddington and Murray.
- BGM Environmental Management Liaison Group.
- BGM employees and contractors.
- Conservation Council of WA.
- Noongar Land Council.
- Peel Development Commission.
- Alcoa of Australia Limited.
- Worsley Joint Venturers.
- Hotham Railway Society.
- General Dwellingup community.
- Landowners adjoining the pipeline route.
- Sotico Pty Ltd.
- Local members of Parliament.

Consultation with stakeholders was undertaken via one-on-one discussions, site visits, presentations, and community meetings. The organisations consulted, the comments

received, and the proponent's response are included in Part I of the environmental review document (WEC, 2001).

As part of this consultation programme, the Boddington Gold Mine Liaison Group (BGMLG) has reviewed the Boddington Expansion and power station proposals, and concluded that the proposals are environmentally acceptable. The BGMLG is a group set up under the existing environmental approvals for the Boddington Gold Mine to review the environmental performance of the mine and to provide a coordinated approach to environmental management of the mine. It comprises of representatives of the Department of Mineral and Petroleum Resources, the Department of Conservation and Land Management, the Department of Environmental Protection, and the Water and Rivers Commission. The group meets at the Boddington Gold Mine on a regular basis to review environmental performance and discuss environmental management issues. A copy of the BGMLG's advice to the EPA is contained in Appendix 4.

4. Relevant environmental factors

The summary of all of the environmental factors and their management is outlined in the Executive Summary of the environmental review document (WEC, 2001).

In the EPA's opinion the following are the environmental factors relevant to the proposal:

- a) Flora and vegetation – clearing for construction of gas pipeline and changes to distribution of clearing in the Boddington Expansion; and
- b) Greenhouse gas emissions – power supply to the Boddington Expansion.

4.1 Flora and vegetation

The EPA's environmental objectives for this factor are to:

- (i) maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.
- (ii) protect Declared Rare and Priority Flora, consistent with the provisions of the *Wildlife Conservation Act 1950*.

EPS assessment – on-site power station

The construction of the gas pipeline will require the clearing of a 3-10 metre strip along the 65 km length of the pipeline (approximately 30.5 ha overall). Construction activity also has the potential to introduce, or increase the spread, of disease and weeds. Once the pipe is laid, the disturbed area would be covered and rehabilitated. Due to the small width of disturbance there is scope to avoid areas of high environmental significance through the choice of an appropriate route.

A survey of vegetation and flora has been conducted along the proposed route of the pipeline. This survey defined vegetation to site vegetation type level on the coastal section and to complex level for the remainder of the route. The surveys have provided sufficient information to determine areas where special care needs to be taken to minimise environmental impacts (that is, those areas likely to contain declared rare or priority flora, poorly represented vegetation communities, or high risk ecological systems – disease or weed prone) and have not identified any fatal flaws in the route. In order to reduce impacts the pipeline route is generally located within the Hotham Valley Rail Reserve, much of which has

been previously disturbed. Within the rail reserve itself, there is still scope to avoid local vegetation or flora of significance by choosing a particular side of the railway reserve or possibly laying the pipeline under the railway.

The proponent has given a commitment (Commitment 2, Appendix 2) to prepare a Vegetation and Flora Management Plan to minimise the immediate impacts of construction and ensure long-term rehabilitation of the affected areas. Key components of this plan will be:

- further detailed surveys for declared rare flora and priority species to guide detailed route selection;
- clearing widths set dependent on the significance of vegetation and flora;
- dieback disease and weed management measures in high risk ecological systems; and
- rehabilitation measures and completion criteria.

The EPA notes that with proper route selection and management of activities the environmental impacts would be local and temporary, and thus meets its objectives. The EPA considers that implementation of the proponent's commitment for a Vegetation and Flora Management Plan will ensure that proper route selection and management is applied.

Section 46 assessment – Boddington Expansion

While the proposed expansion will not result in any significant overall increase in clearing, it would result in proportionally more clearing within State Forest and so has the potential to affect different vegetation types. This difference in vegetation types impacted is mainly due to changes in the location of waste rock dumps.

As part of the existing conditions of approval the proponent has been evaluating land exchange options aimed to offset some of the clearing associated with the mine. Under the current environmental approval (Statement 453) the proponent is required to arrange for replacement of a section of land (at that time located within the proposed Duncan Management Priority Area) to be affected by the residue disposal area. The proponent has identified a potential area for exchange adjacent to the proposed Monadnocks National Park and has conducted a botanical survey of this area to establish its conservation value relative to that of the affected project areas.

The proponent has committed to continue with the land exchange (Commitment 11, Appendix 3) and is also considering an option that would provide more land of comparable conservation values to the conservation estate. This option involves a broader exchange that would consider all land in State Forest affected by the proposal. The expected outcome of the land exchange is that the land would be incorporated into the conservation estate and thereafter managed to protect and enhance its conservation values.

Only two significant site-vegetation types will be affected more by the proposed expansion than the currently approved project. These are site-vegetation types:

- L Open woodland of *Eucalyptus patens* with some *Eucalyptus wandoo*, which is locally and regionally restricted (11 ha affected); and
- G3 Open heath of *Dryandra squarrosa* subsp. *squarrosa* – *Hakea incrassata* – *Hakea undulata*, *Petrophile heterophylla*, - *Petrophile serruriae*, which is locally and regionally significant and has priority species (14 ha affected).

The land exchange option provides more area of G3 than is lost through the expansion. However, site-vegetation type L is not present in the land exchange area but is represented in the conservation estate in the region.

The EPA therefore considers that the continuing requirement for a land exchange will ensure that its objectives for this factor are met. Furthermore, the EPA commends the proponent's willingness to consider options that go beyond the original requirements, and which would provide a greater conservation benefit to the State.

4.2 Greenhouse gas emissions

The EPA's objective for this factor is to ensure that best available efficient technologies are used in Western Australia to minimise greenhouse gas emissions.

EPS assessment – on-site power station

The principle greenhouse gas produced by the power station will be carbon dioxide. Up to 360 000 tonnes per annum of carbon dioxide would be produced by the burning of fuel in the power station.

The EPA notes that the proposed power station employs best available technology to reduce greenhouse gas emissions. It uses a combined cycle plant, which captures waste heat to generate additional electricity. It is therefore more efficient in terms of greenhouse gas emissions than other types of fuel-burning power stations, as is show by Table 3 below.

In addition, the proponent has made equivalent commitments to those made for the Boddington expansion, which are described below.

The EPA therefore considers that its environmental objective for this factor can be met through implementation of the proponent commitments.

Section 46 assessment – Boddington Expansion

The main source of greenhouse gases is the usage of electricity for the processing of gold ore. The predominant greenhouse gas would be carbon dioxide and the emissions for existing, approved, and proposed operations are summarised in the following table.

Table 3 Summary of greenhouse gas (carbon dioxide) emissions.

Case	Existing BGM 2000	Previously approved basement proposals	Expansion 29 Mtpa	Expansion 29 Mtpa
Power source	Western Power grid	Western Power grid	Western Power grid	Gas fired power station
Peak annual CO ₂ emissions (t/a)	179,000	781,000	952,000	453,000
Peak annual carbon intensity (kg CO ₂ /t of mill throughput)	20.8	42.1	40.8	23.60
Average carbon intensity (kg CO ₂ /tonne of mill throughput)	NA	38.7	33.2	16.0
Cumulative emissions 2002-2010 (t)	NA	6,269,000	7,874,000	3,731,000

As can be seen from the table the overall proposal is a significant source of greenhouse gas emissions, but this would be significantly reduced if the gas-fired power station was adopted. However, even if this option was not chosen, the expanded proposal while having larger total

emissions does result in a greater greenhouse gas efficiency than the currently approved proposal.

In addition, the proponent will assist in the revegetation of the Hotham catchment through a scheme with the local community aimed at facilitating revegetation/restoration of significant areas of degraded land each year (Commitment 35, Appendix 3). This would offset some greenhouse gas emissions and enhance biodiversity. The proponent will also prepare and implement a Greenhouse Gas Management Plan in accordance with the EPA's guidance note on this issue (EPA, 1998).

The EPA therefore considers that its environmental objective for this factor can be met through implementation of the proponent commitments.

Notwithstanding the above and the fact that there would at most be a 171 00 tonnes per annum increase in emissions as a result of the proposed expansion, the EPA would prefer that additional power was generated from greenhouse gas efficient power stations (such as combined cycle gas-fired power stations) either on-site, or by Western Power.

5. Rationalisation of the Environmental Conditions and Commitments

The EPA sees the advantages in rationalising the existing three statements of environmental approval. It would ensure that there is a clear understanding of the obligations of each proponent. It would also provide a simpler description of the environmental conditions and commitments that apply to a single mining and processing operation (the Boddington and Hedges Gold Mines). Draft amended statements for both Worsley Alumina Pty Ltd and Alcoa World Alumina - Australia are provided in Appendix 3.

In carrying out this rationalisation it is important that none of the intent of previous environmental conditions or commitments is lost in the transition from one set of statements to another. The EPA considers that there is no loss through the proposed amendments.

5. Conclusions

For both assessments, the EPA considers that the consultation with stakeholders by the proponent has been appropriate, and that in response the proposal has been modified to adequately address the issues raised.

In addition the EPA notes the advice of the Boddington Gold Liaison Group (a group representing government departments that oversee environmental management of the mine) that the proposals are environmentally acceptable.

EPS assessment – on-site power station

The EPA considers that the key issues associated with this proposal are the impact on vegetation and flora due to the construction of the gas pipeline, and the greenhouse gas emissions from the power station over the life of the plant. The EPA is satisfied that the measures that the proponent has put forward with regard to detailed route selection and management of construction activities will ensure that the impacts of construction will be local and short-term. On the issue of greenhouse gases, the EPA notes that best available

technology (a combined cycle power station) has been chosen to reduce emissions and that offsets through revegetation are also proposed.

The EPA therefore concludes that the proposal is capable of being managed to meet the EPA's objectives provided there is satisfactory implementation of the proponent's commitments and recommended conditions as set out in Appendix 2.

Section 46 assessment – Boddington Expansion

The EPA notes that in reviewing the approved project and proposing this expansion, the proponent has taken a number of opportunities to improve the expected environmental outcomes of the proposal. Examples of this improvement include, the addition of a process to reduce cyanide levels in residues, greater opportunities for backfilling of pits, and the option of using a more efficient power supply. The proponent has also made significant progress on a land exchange arrangement that will provide a conservation benefit to the State and offset the impacts of the proposal.

Due to the proposed changes to the approved project there are some changes in the scale and nature of environmental impacts. The key issues associated with the changes are impacts on vegetation and flora, and increased greenhouse gas emissions. For both these issues the proponent will implement offset measures. These include a preferred land exchange of land of comparable conservation value to areas of State Forest affected by the mining operation, and assistance to the community in the revegetation of the Hotham catchment.

The EPA thus concludes the Boddington expansion will overall provide better environmental outcomes and therefore meet its environmental objectives, provided there is satisfactory implementation of the proponent's commitments and recommended conditions as set out in Appendix 3.

The EPA has also reviewed the proposed rationalisation of the environmental approvals for the Hedges and Boddington Gold Mines and believes that the revised conditions and commitments set out in Appendix 3 adequately address the requirements of past approvals.

7. Recommendations

EPS assessment – on-site power station

The EPA considers that the proponent has demonstrated, in the EPS document, that the proposal can be managed in an environmentally acceptable manner and provides the following recommendations to the Minister for the Environment and Heritage:

1. That the Minister notes that the proposal being assessed is for [a Gas-fired Power Station and Natural Gas Pipeline, 12 km Northwest of Boddington](#).
2. That the Minister considers the report on the relevant environmental factors as set out in Sections [4.1](#) and [4.2](#).
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions and proponent commitments as set out in Appendix [2](#).

4. That the Minister imposes the conditions and procedures recommended in Appendix 2 of this report.

Section 46 assessment – Boddington Expansion

The EPA submits the following recommendations to the Minister for the Environment and Heritage:

1. That the Minister notes that this report is pursuant to Section 46(3) of the *Environmental Protection Act 1986* and thus is limited to consideration of proposed changes to the original conditions.
2. The Minister notes that the proposed change is both an expansion of the Boddington and Hedges Gold Mine, and a rationalisation of the statements of environmental approval that currently apply to each mine separately.
3. The EPA recommends that the Minister considers the report on the relevant environmental factors as set out in Sections 4.1 and 4.2.
4. That the Minister notes that the EPA has concluded that the modified proposal can be managed to meet the EPA's objectives, and thus not impose an unacceptable impact on the environment provided there is satisfactory implementation by the proponent of the amended conditions, including the proponent's commitments, as set out in Appendix 3.
5. The Minister imposes the amended conditions, commitments and procedures recommended in Appendix 3 (which contains two separate sets of recommended conditions) of this report.

Appendix 1

References

EPA (1985), *Worsley Alumina Joint Venturers – Boddington Gold Mine Proposal: Environmental Protection Authority report and recommendations*. Environmental Protection Authority Bulletin 219, October 1985. Perth WA.

EPA (1987), *Hedges Gold Project: Report and recommendations of the Environmental Protection Authority*. Environmental Protection Authority Bulletin 314, December 1987. Perth WA.

EPA (1997a), *Boddington gold mine – Extended basement operation and changes to existing environmental conditions: Report and recommendations of the Environmental Protection Authority*. Environmental Protection Authority Bulletin 850, April 1997. Perth WA.

EPA (1997b), *Hedges gold project, Boddington – proposal for an increase in annual throughput from 2 Mtpa to 4 Mtpa – changes to environmental conditions: Report and recommendations of the Environmental Protection Authority*. Environmental Protection Authority Bulletin 851, April 1997. Perth WA.

EPA (1998), *Guidance for the Assessment of Environmental Factors, Minimising Greenhouse Gas Emissions*. Environmental Protection Authority, No. 12 Interim, June 1998. Perth WA.

WEC (2001), *Boddington and Hedges Gold Mines, Boddington Expansion, Shire of Boddington, Section 46 Review – and – Gas-fired Power Station and Natural Gas Pipeline, 12 km Northwest of Boddington, Environmental Protection Statement*. Prepared by Welker Environmental Consultancy for Worsley Alumina Pty Ltd, November 2001, Perth WA.

Appendix 2

Gas-fired power station and natural gas pipeline, 12 km northwest of Boddington

Recommended Environmental Conditions

and Proponent's Commitments

**GAS-FIRED POWER STATION AND GAS PIPELINE,
12 KM NORTH-WEST OF BODDINGTON
SHIRE OF BODDINGTON**

Proposal: The construction and operation of a 110 MW gas-fired power station at the Boddington Gold Mine, approximately 12 kilometres north-west of Boddington, and the construction of a gas pipeline to the power station, predominantly along the railway reserve between Pinjarra and Boddington, as documented in schedule 1 of this statement.

Proponent: Worsley Alumina Pty Ltd

Proponent Address: PO Box 48 Boddington, WA 6390.

Assessment Number: 1408

Report of the Environmental Protection Authority: Bulletin 1035

The proposal to which the above report of the Environmental Protection Authority relates may be implemented subject to the following conditions and procedures:

Procedural Conditions

1 Implementation and Changes

- 1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions of this statement.
- 1-2 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.
- 1-3 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is not substantial, the proponent may implement those changes upon receipt of written advice.

2 Proponent Commitments

- 2-1 The proponent shall implement the consolidated environmental management commitments documented in schedule 2 of this statement.

2-2 The proponent shall implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of the conditions and procedures in this statement.

3 Proponent Nomination and Contact Details

3-1 The proponent for the time being nominated by the Minister for the Environment and Heritage under section 38(6) or (7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal until such time as the Minister for the Environment and Heritage has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.

3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.

3-3 The proponent shall notify the Department of Environmental Protection of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

4-1 The proponent shall provide evidence to the Minister for the Environment and Heritage within five years of the date of this statement that the proposal has been substantially commenced or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment and Heritage will determine any dispute as to whether the proposal has been substantially commenced.

4-2 The proponent shall make application for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement to the Minister for the Environment and Heritage prior to the expiration of the five-year period referred to in conditions 4-1.

The application shall demonstrate that:

- the environmental factors of the proposal have not changed significantly;
- new, significant environmental issues have not arisen; and
- all relevant government authorities have been consulted.

Note: The Minister may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal.

Environmental Conditions

5 Closure Plans

5-2 At least six months prior to the anticipated date of closure, or at a time agreed with the Environmental Protection Authority, the proponent shall prepare a Final Closure Plan designed to ensure that the site is left in an environmentally acceptable condition to the

requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

The Final Closure Plan shall address:

- 1 removal or, if appropriate, retention of plant and infrastructure in consultation with relevant stakeholders;
- 2 rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s); and
- 3 identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.

5-3 The proponent shall implement the Final Closure Plan required by condition 5-2 until such time as the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, that the proponent's closure responsibilities are complete.

6 Compliance Audit and Performance Review

6-1 The proponent shall prepare an audit program in consultation with and submit compliance reports to the Departmental Protection which address:

- the implementation of the proposal as defined in schedule 1 of this statement;
- evidence of compliance with the conditions and commitments; and
- the performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the *Environmental Protection Act 1986*, the Chief Executive Officer of the Department of Environmental Protection is empowered to audit the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans, related to the conditions, procedures and commitments contained in this statement. Usually, the Department of Environmental Protection prepares an audit table which can be utilised by the by the proponent, if required, to prepare an audit program to ensure that the proposal is implemented as required. The Chief Executive Officer is responsible for the preparation of written advice to the proponent, which is signed off by either the Minister or, under an endorsed condition clearance process, a delegate within the Environmental Protection Authority or the Department of Environmental Protection that the requirements have been met.

6-2 The proponent shall submit a performance review report every five years after the start of the operations phase to the requirements of the Minister for Environment and Heritage on advice of the Environmental Protection Authority, which addresses:

- the major environmental issues with the project; the objectives for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those objectives;
- the level of progress in the achievement of sound environmental performance, including industry bench marking and the use of best available technology where practicable;

- significant improvements gained in environmental management, including the use of external peer reviews;
- stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and
- the proposed environmental objectives over the next five years, including improvements in technology and management processes.

Procedures

- 1 Where the condition states “to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority”, the Chief Executive Officer of the Department of Environmental Protection will obtain that advice for the preparation of written advice to the proponent.
- 2 The Environmental Protection Authority may seek advice from other agencies, as required, in order to provide its advice to the Chief Executive Officer of the Department of Environmental Protection.

Note

- 1 The Minister for the Environment and Heritage will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environmental Protection over the fulfilment of the requirements of the conditions.
- 2 The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.

Schedule 1

The Proposal

The proposal is to construct and operate a 110 MW gas-fired power station and construct a gas pipeline from Pinjarra to the Boddington Gold Mine as specified in the key characteristics table below (Table 1).

The location of the Boddington Gold Mine site is shown in Figure 1 and the pipeline route is shown in Figure 2.

Table 1 Key Proposal Characteristics

Element	Quantities/Description
Life of project	Life of Boddington Expansion (15-20 years)
Power station	
Capacity	110 megawatts
Fuel	Gas
Cooling water	
consumption	About 2400 megalitres per annum
source	D1 or D4 water supply reservoir
Plant	Two gas turbines Two waste heat boilers One steam turbine Reverse osmosis water treatment plant Two 20 metre stacks and two bypass stacks
Air emissions	
Nitrogen Oxides	4.6 grams per second
Greenhouse gases (CO ₂)	360,000 tonnes per year at 95% of capacity
Gas pipeline	
Vegetation disturbance (area)	About 30.5 hectares
Length and diameter	65 kilometres, 210 millimetres outside diameter
Pressure	4.9 megapascals
Alignment	Principally along rail reserve (between Boddington and Pinjarra)

**Proponent's Consolidated Environmental Management
Commitments**

3 December 2001

**GAS-FIRED POWER STATION AND GAS
PIPELINE, 12 KM NORTH-WEST OF
BODDINGTON, SHIRE OF BODDINGTON
(Assessment No. 1408)**

Worsley Alumina Pty Ltd

Topic	Objective	Action	Timing	Advice
Environmental Factors				
Environmental Management Approach	<ul style="list-style-type: none"> To ensure construction, operational and decommissioning phases of the power station and gas pipeline are managed to reduce unnecessary impacts. To ensure unavoidable impacts are managed to an acceptable level. 	<ol style="list-style-type: none"> Review and modify as necessary the environmental management systems to be in accordance with the principles of recognised national standards. Implement best practice environmental management where "best practice" implies the use of the best practicable equipment, processes, systems or techniques relevant to the power station operations. Undertake regular internal environmental audits of key processes. 	During operation	
Vegetation communities and flora	<ul style="list-style-type: none"> To maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities. To protect Declared Rare and Priority Flora, consistent with the provisions of the Wildlife Conservation Act 1950. 	<ol style="list-style-type: none"> Refine the final pipeline alignment in the rail reserve to the requirements of CALM. 	Pre-commissioning	CALM
		<ol style="list-style-type: none"> Prepare a Vegetation Management Plan to the requirements of CALM and include with construction environmental management plan. The Vegetation Management Plan will address the following: <ol style="list-style-type: none"> a detailed description of the route for the pipeline; dieback disease management procedures; management measures to avoid impacts on rare flora and vegetation at creek crossings; clearing widths along the route; results of any detailed flora surveys of the alignment including the location of any rare flora; rehabilitation measures and objectives for previously cleared and uncleared areas; weed control; and completion criteria and monitoring of rehabilitation. Implement the Vegetation Management Plan in commitment 5 to the requirements of CALM. Conduct further detailed surveys for Priority and Declared Rare Flora along the final alignment as required. 	<p>Pre-commissioning & construction</p> <p>Prior to pipeline construction</p>	CALM

Topic	Objective	Action	Timing	Advice
Noise	<ul style="list-style-type: none"> To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring that noise levels meet statutory requirements and acceptable standards. 	<p>8. Prepare a Construction Noise Management Plan and include with construction environmental management plan to address:</p> <ol style="list-style-type: none"> the Australian Standard 2436–1981 “Guide to Noise Control on Construction, Maintenance and Demolition Sites”; equipment noise criteria; and community consultation. <p>9. Implement the Construction Noise Management Plan in commitment 8.</p>	Pre-commissioning & construction	
Blast noise and vibration	<ul style="list-style-type: none"> To ensure that noise does not cause unacceptable community annoyance and meets the criteria used for noise impacts specified in the Environmental Protection (Noise) Regulations 1997 and that ground vibration peak particle velocity does not exceed 5 mm/s at any building. 	<p>10. Prepare a Blast Noise and Vibration Plan as part of the construction environmental management plan to address:</p> <ol style="list-style-type: none"> the <i>Environmental Protection (Noise) Regulations 1997</i>; consultation with owners of buildings or structures that may be affected by vibration; and monitoring. <p>11. Implement the Blast Noise and Vibration Plan as part of the construction environmental management plan.</p>	Pre-commissioning & construction	
Particulates and dust	<ul style="list-style-type: none"> To ensure that the dust levels generated by the proposal do not adversely impact upon welfare and amenity by meeting statutory requirements and acceptable standards. 	<p>12. Implement the guidelines “Land development sites and impacts on air quality – A guideline for the prevention of dust and smoke pollution from land development sites in Western Australia” (DEP 1996).</p>	Pre-commissioning & construction	
Surface water and groundwater - quantity and quality	<ul style="list-style-type: none"> To maintain or improve the quality of surface and ground water to ensure that the existing and potential uses, including ecosystem maintenance, are protected consistent with the draft WA Water Quality Guidelines for Fresh and Marine Waters (EPA 1993) and the NHMRC/ARMCANZ Australian drinking water guidelines – National Water Quality Management Strategy. 	<p>13. Prepare a Water Quality and Quantity Management Plan to address:</p> <ol style="list-style-type: none"> dewatering; potential spillage of fuels and chemicals; disruption and restoration of drainage patterns; and hydrostatic testing of pipeline, <p>and include with the construction environmental management plan.</p> <p>14. Implement the Water Quality and Quantity Management Plan in commitment 13.</p>	Pre-commissioning, construction, & operation	WRC

Topic	Objective	Action	Timing	Advice
Risk and hazard	<ul style="list-style-type: none"> Ensure that risks to the public associated with the presence of the gas pipeline meet applicable criteria and are minimised. 	<p>15. Prepare a Risk Management Plan for the gas pipeline to address:</p> <ol style="list-style-type: none"> assessment of the risk and risk mitigation measures in accordance with appropriate standards; management of risk to achieve "low" or negligible" risk category within 210 metres of pipeline, or reduce risk to the lowest practicable level; and consultation with nearby residents. <p>16. Implement the Risk Management Plan in commitment 15.</p>	Pre-commissioning, & operation	
Greenhouse gas emissions	<ul style="list-style-type: none"> To ensure that "greenhouse gas" emissions associated with the project are adequately addressed and best available efficient technologies are used in Western Australia to minimise Western Australia's "greenhouse gas" emissions. To mitigate "greenhouse gas" emissions in accordance with the Framework Convention on Climate Change 1992, and consistent with the National Greenhouse Strategy. To ensure that all reasonable and practicable measures are taken to minimise the emission of greenhouse gases. 	<p>17. Prepare a Greenhouse Gas Management Plan that will include:</p> <ol style="list-style-type: none"> calculation of the "greenhouse gas" emissions associated with the proposal, as indicated in "Minimising Greenhouse Gas Emissions, Guidance for the Assessment of Environmental Factors, No. 12" published by the Environmental Protection Authority; specific measures to minimise the "greenhouse gas" emissions associated with the proposal; monitoring of "greenhouse gas" emissions; estimation of the "greenhouse gas" efficiency of the project (per unit of product and/or other agreed performance indicators) and comparison with the efficiencies of other comparable projects producing a similar product; analysis of the extent to which the proposal meets the requirements of the National Strategy using a combination of: <ul style="list-style-type: none"> "no regrets" measures; "beyond no regrets" measures; landuse change or forestry offsets; and international flexibility mechanisms. a target set by the proponent for the reduction of total net "greenhouse gas" emissions and/or "greenhouse gas" emissions (per unit of product time), and annual reporting of progress made in achieving this target. 	Pre-commissioning & operation	

Topic	Objective	Action	Timing	Advice
		<p>Note: In point 5 above, the following definitions apply:</p> <ul style="list-style-type: none"> • “no regrets” measures are those that can be implemented by a proponent which are effectively cost neutral and provide the proponent with returns and savings which offset the initial capital expenditure that may be incurred; and • “beyond no regrets” measures are those that can be implemented by a proponent which involve some additional cost that is not expected to be recovered. <p>18. Implement the Greenhouse Gas Management Plan in commitment 17.</p> <p>19. Prepare a Revegetation Scheme to assist revegetation of the Hotham catchment that includes sponsorship of:</p> <ul style="list-style-type: none"> • research, planting or revegetation trials on farming land; • re-establishment of riparian vegetation in degraded areas; and • enhancement of biodiversity in degraded areas. <p>20. Implement the Revegetation Scheme referred to in commitment 19.</p>		

Abbreviations:

CALM	Department of Conservation and Land Management
DEP	Department of Environmental Protection
WRC	Water and Rivers Commission
EPA	Environmental Protection Authority
NHMRC	National Health and Medical Research Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand

Appendix 3

Boddington and Hedges Gold Mines

Recommended Environmental Conditions

and Proponent's Commitments

BODDINGTON AND HEDGES GOLD MINES
SHIRE OF BODDINGTON

Proposal: The proposals are for mining and processing oxide ore, near-surface basement ore, supergene ores and basement ores at the Boddington Gold Mine, and mining at Hedges Gold Mine, approximately 12 kilometres north west of Boddington, and to provide and operate associated facilities, as documented in schedule 1 of this statement.

Proponent: Worsley Alumina Pty Ltd

Proponent Address: PO Box 48 Boddington

Assessment Number: 1409

Previous EPA assessment numbers: 148, 156, 182, 238, 238-1, 700, 901, 1033, 1053, 1057

Previous ministerial statement numbers:

Boddington Gold Mine: 19 published on 15 February 1988
49 published on 8 December 1988
85 published on 22 November 1989
100 published on 8 June 1990
299 published on 21 January 1993
379 published on 25 January 1995
453 published on 30 June 1997
489 published on 24 December 1998
Hedges Gold Mine: 20 published on 25 February 1988
450 published on 26 June 1998

Report of the Environmental Protection Authority: Bulletin 103X

Previous Reports of the Environmental Protection Authority:

313, 314, 361, 408, 430, 661, 766, 850 and 851

The implementation of the Boddington Gold Mine proposal to which the above reports of the Environmental Protection Authority relate is now subject to the following conditions and procedures which replace all previous Boddington Gold Mine conditions and procedures and those conditions and procedures formerly applicable to mining at the Hedges Gold Mine:

Procedural Conditions

1 Implementation and Changes

- 1-1 The proponent shall implement the proposals as documented in schedule 1 of this statement subject to the conditions of this statement.
- 1-2 Where the proponent seeks to change any aspect of the proposals as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.
- 1-3 Where the proponent seeks to change any aspect of the proposals as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is not substantial, the proponent may implement those changes upon receipt of written advice.

2 Proponent commitments

- 2-1 The proponent shall implement the consolidated environmental management commitments documented in schedule 2 of this statement.
- 2-2 The proponent shall implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of conditions in this statement.

3 Proponent Nomination and Contact Details

- 3-1 The proponent for the time being nominated by the Minister for the Environment and Heritage under section 38(6) or (7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposals until such time as the Minister for the Environment and Heritage has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposals.
- 3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposals will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposals shall also be provided.
- 3-3 The nominated proponent shall notify the Department of Environmental Protection of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

- 4-1 The proponent shall provide evidence to the Minister for the Environment and Heritage within five years of the date of this statement that the proposals have been substantially commenced or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment and Heritage will determine any dispute as to whether the proposals have been substantially commenced.

4-2 The proponent shall make application for any extension of approval for the substantial commencement of the proposals beyond five years from the date of this statement to the Minister for the Environment and Heritage, prior to the expiration of the five-year period referred to in condition 4-1.

The application shall demonstrate that:

environmental factors of the proposal have not changed significantly;

new, significant environmental issues have not arisen; and

all relevant government authorities have been consulted.

Note: The Minister may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the proposal.

5 Boddington Gold Mine Environmental Management Liaison Group

5-1 Boddington Gold Mine Environmental Management Liaison Group will comprise of representatives of State Government agencies whose areas of responsibility are affected by the mining and processing operations of the proponent, and will include representatives of the Department of Environmental Protection, the Department of Mineral and Petroleum Resources (chair), the Department of Conservation and Land Management and the Water and Rivers Commission.

5-2 The terms of reference will be developed by the Boddington Gold Mine Environmental Management Liaison Group to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority and the Department of Mineral and Petroleum Resources.

5-3 The Boddington Gold Mine Liaison Group will review the proponent's compliance with environmental conditions and commitments (in particular conditions 4 and 6) and will provide advice on compliance to the Minister for the Environment and Heritage; the State Mining Engineer; and each agency responsible for assessing compliance with the environmental conditions and commitments.

Environmental Conditions

6 Compliance Audit and Performance Review

6-1 The proponent shall prepare an audit program in consultation with and submit compliance reports to the Department of Environmental Protection which address:
the implementation of the proposals as defined in schedule 1 of this statement;
evidence of compliance with the conditions and commitments; and
the performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the *Environmental Protection Act 1986*, the Chief Executive Officer of the Department of Environmental Protection is empowered to audit the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans, related to the conditions, procedures and commitments contained in this statement. Usually, the Department of Environmental Protection prepares an audit table which can be utilised by the proponent, if required, to prepare an audit program to ensure that the proposals are implemented as required. The Chief Executive Officer is responsible for

the preparation of written advice to the proponent, which is signed off by either the Minister or, under an endorsed condition clearance process, a delegate within the Environmental Protection Authority or the Department of Environmental Protection that the requirements have been met.

- 6-2 The proponent shall submit a performance review report every five years after the start of the operations phase to the requirements of the Minister for Environment and Heritage on advice of the Environmental Protection Authority, which addresses:
- the major environmental issues associated with the project; the objectives for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those objectives;
 - the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable;
 - significant improvements gained in environmental management, including the use of external peer reviews;
 - stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and
 - the proposed environmental objectives over the next five years, including improvements in technology and management processes.

7 Hotham River

- 7-1 The proponent shall only pump water from the Hotham River when the river flow is in excess of 342 kilolitres per hour as measured at Marradong River bridge gauging station.
- 7-2 When pumping from the Hotham River, the proponent shall not cause the remaining river flow to be reduced to below the level of 342 kilolitres per hour as measured at Marradong River bridge gauging station.

Note: Water is extracted from the Hotham River in accordance with licence conditions set by the Water and Rivers Commission under the provisions of the Rights In Water and Irrigation Act.

8 Closure Plans

- 8-1 Prior to October 2003, the proponent shall prepare, and subsequently implement a Preliminary Closure Plan, which provides the framework to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority. This plan will be reviewed every five years.

The Preliminary Closure Plan shall address:

- 1 rationale for the siting and design of plant and infrastructure as relevant to environmental protection and conceptual plans for its removal or, if appropriate, retention of plant and infrastructure;
 - 2 a conceptual rehabilitation plan for all disturbed areas and description of a process to agree on the end land use(s) with all stakeholders;
 - 3 a conceptual plan for a care and maintenance phase ; and
 - 4 management of noxious materials to avoid the creation of contaminated areas.
- 8-2 At least six months prior to the anticipated date of closure, or at a time agreed with the Environmental Protection Authority, the proponent shall prepare a Final Closure

Plan designed to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

The Final Closure Plan shall address:

- 1 removal or, if appropriate, retention of plant and infrastructure in consultation with relevant stakeholders;
- 2 rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s);
- 3 identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities;
- 4 long term management of mined out pits, residue disposal areas, process water ponds, non-mineralised rock stockpiles, water supply dams, processing plant and associated infrastructure; and
- 5 long term management measures for groundwater and surface waters affected by the project.

8-3 The proponent shall implement the Final Closure Plan required by condition 8-2 until such time as the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, that the proponent's closure responsibilities are complete.

8-4 The proponent shall make the Final Closure Plan required by condition 8-2 publicly available, to the requirements of the Minister for the Environment and Heritage on the advice of the Environmental Protection Authority.

Procedures

- 1 Where the condition states "to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority", the Chief Executive Officer of the Department of Environmental Protection shall obtain that advice for the preparation of written advice to the proponent.
- 2 The Environmental Protection Authority may seek advice from other agencies, as required, in order to provide its advice to the Chief Executive Officer of the Department of Environmental Protection.

Note

- 1 The Minister for the Environment and Heritage will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environmental Protection over the fulfilment of the requirements of the conditions.
- 2 The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.

Schedule 1

The Proposals

The proposals to mine and process oxide and basement ores and to operate associated facilities at the Boddington Gold Mine as specified in the key proposal characteristic table below (Table 1).

Table 1 Key Proposal Characteristics

Element	Boddington Gold Mine Project
MINING	
Life of mine	Basement mining for a period of 15-20 years. Oxide mining complete in 2001
Open cut mining	Mainly basement ores and some oxide ores
	Two basement open cuts down to approximately –125 mAHD
Stockpiles and associated drainage systems	
	Bauxite stockpile (about 24 hectares of clearing)
	Non-mineralised stockpiles (about a total of 278 hectares of clearing)
Backfilling of mining pits	Backfilling of Wandoo North pit to normal surface level or above
Thirty-four Mile Brook	Diversion of natural and previously diverted channel and construction of D4 water supply reservoir bypass in State Forest
PROCESSING	
Basement and oxide crushing and milling	
Power source	Western Power grid or on-site natural gas fired power station
Throughput	Up to 29 million tonnes per annum
Facilities	Three crushers
	Three grinding rolls
	Ore conveyors
	Three ball mills
	Fifteen flotation cells
	Four thickeners
	SART copper and cyanide recovery plant to reduce cyanide concentration in decant pond to less than 50 mg/L
VEGETATION DISTURBANCE	3,400 hectares
RESOURCE CONSUMPTION	
Water	Up to 34 megalitres per day
Electrical energy	Approximately 830,000 megawatt hours per annum
Cyanide (30% solution)	Up to 47,000 tonnes per annum
Lime	Up to 15,000 tonnes per annum
Caustic	Up to 10,000 tonnes per annum
Hydrochloric acid	Up to 2200 tonnes per annum
Sulphuric acid	Up to 4200 tonnes per annum
Sodium hydrosulphide	Up to 1500 tonnes per annum
Xanthates	Up to 595 tonnes per annum
Frother	Up to 580 tonnes per annum
Flocculant	Up to 313 tonnes per annum
Storage of raw materials	
Lime	Up to 300 tonnes
Cyanide	Up to 3100 kilolitres
Caustic	Up to 400 kilolitres
Hydrochloric acid	Up to 60 kilolitres
Sulphuric acid	Up to 70 kilolitres

Element	Boddington Gold Mine Project
Sodium hydrosulphide	Up to 110 tonnes
WATER STORAGE RESERVOIRS	
D1 WSR	Capacity up to 13,000 megalitres
	Stormwater surge storage
D4 WSR	Storage capacity reducing to about 1400 megalitres
WATER SUPPLY	
Mine dewatering	Stored in water supply reservoirs for use in processing
Thirty-four Mile Brook catchment	Catchment run-off above D4 water supply reservoir directed to D4 water supply reservoir
Hotham River via pipeline	Abstraction of up to 3.3 megalitres per hour and storage in water supply reservoirs
RESIDUE DISPOSAL	Up to 29 million tonnes per annum up to 63% solids (oxide residue up to 35% solids)
	Residue disposal area capacity up to 310 million tonnes
	Decant on residue disposal area
Other	
Excess water discharge	Up to 9600 megalitres per annum
BGM camp	Expansion of facilities to cater for construction workforce
Truck movements (weekly)	Up to 310
Product	Gold metal and copper concentrate
Exchange of land with comparable conservation value.	Options for exchange of up to 1365 hectares of land affected by residue disposal and all State Forest areas within project area

**Proponent's Consolidated Environmental Management
Commitments**

1 August 2000

**BODDINGTON GOLD MINE
SHIRE OF BODDINGTON (Assessment No. 1409)**

Worsley Alumina Pty Ltd

Topic	Environmental Objective	Action (*indicates modified or new commitment)	Phase	Advising agency
Key Environmental Factors				
Environmental Management Approach	<ul style="list-style-type: none"> • To ensure construction, operational and decommissioning phases of the Boddington Expansion are managed to reduce unnecessary impacts. • To ensure unavoidable impacts are managed to an acceptable level. 	<ol style="list-style-type: none"> 1. Review and modify as necessary the environmental management system to be in accordance with the principles of recognised national standards. 2. Implement best practice environmental management where best practice implies the use of the best practicable equipment, processes, systems or techniques relevant to BGM operations. 3. Undertake regular internal environmental audits of key processes. 4. Prepare and submit to the BGM Environmental Management Liaison Group annual environmental reports which will incorporate environmental management plans and include details of environmental management measures and commitments, rehabilitation plans, internal auditing plans, compliance reports and research for the BGM project. 5. Prepare and submit plans to the BGM Environmental Management Liaison Group through the annual environmental reporting process which incorporates plans and measures to reduce as far as practicable the out-of-pit placement of non-mineralised rock for the BGM project. 	Ongoing	BGMEMLG [#]

Topic	Environmental Objective	Action (*indicates modified or new commitment)	Phase	Advising agency
Flora and Fauna Conservation	<ul style="list-style-type: none"> • To ensure no significant loss of priority flora and regionally significant vegetation associations. • To ensure that declared rare flora are protected. • To ensure that there is no significant loss of habitats for threatened and priority fauna. 	<p>6. Avoid wherever practicable the clearing of significant vegetation types in areas where priority flora species are known to occur (e.g. heathlands, shrublands and woodlands), and in significant habitats for threatened fauna.</p> <p>7. Prevent, as far as practicable, the effect of water logging of vegetation in the vicinity of residue disposal areas.</p> <p>8. Carry out regular monitoring of the abundance and distribution of flora and fauna in rehabilitation and forest areas adjacent to mined and residue disposal areas in consultation with CALM.</p> <p>9. Encourage recruitment of local rare or priority flora and threatened fauna into rehabilitated areas.</p> <p>10. Research will be conducted into priority species which occur naturally on the BGM site but which have not been recorded in rehabilitation, with the aim of establishing these species in suitable rehabilitation areas.</p> <p>11. Conduct detailed surveys for Priority Flora in areas affected by non-mineralised stockpiles.*</p> <p>12. Identify in consultation with the BGMEMLG and CALM and provide to the State, for incorporation into the conservation estate: preferably land of comparable conservation value and approximately equal to the area of State Forest affected by BGM mining and additional residue disposal activity, or land of comparable conservation value and approximately equal to the area of State Forest affected by additional residue disposal operations.*</p>	Operation	BGMEMLG CALM
Thirty-four Mile Brook Catchment Management	<ul style="list-style-type: none"> • To ensure that the Thirty-four Mile Brook catchment under the control of the BGM project is managed to avoid adverse impacts on the Hotham River and Thirty-four Mile Brook outside the BGM Project Area. 	<p>13. Continue to implement BGM operations in a catchment context.</p> <p>14a Prepare a Diversion Management Plan for Thirty-four Mile Brook. This plan will include a diversion design which adopts the principles of Table 23 of the Section 46 Review for the Boddington Expansion (WEC 2000a).*</p> <p>14b Implement the Diversion Management Plan for Thirty-four Mile Brook prescribed in 14a.*</p>	Ongoing	BGMEMLG WRC

Topic	Environmental Objective	Action (*indicates modified or new commitment)	Phase	Advising agency
Water Resource Protection (Quality)	<ul style="list-style-type: none"> To ensure that the discharge of wastewater from BGM operations does not adversely affect the existing beneficial uses and ecosystems of the Hotham River and Thirty-four Mile Brook in the vicinity of the BGM project. 	<p>15. Implement the strategy as outlined on pp 49-50 of the Extended Basement Operation Consultative Environmental Review for the discharge of excess water via a pipeline and/or Thirty-four Mile Brook to the Hotham River, in accordance with requirements of the DEP and Water and Rivers Commission.</p> <p>16. Review the existing monitoring program (taking into account the Hedges acquisition area) for monitoring groundwater, surface waters (including D1 and D4 water supply reservoirs) and sediments in consultation with the DEP and Water and Rivers Commission.*</p> <p>17. Maintain weak acid dissociable levels of cyanide in D1 reservoir decant water below 5 mg/L.*</p> <p>18. Clean up and rehabilitate any spills in accordance with DEP licence conditions.</p> <p>19. Prevent the migration of diffuse seepage to the South Dandalup catchment by engineering design and back up by monitoring/pumping bores to maintain groundwater levels on the perimeter of residue disposal areas.</p> <p>20a Prepare a new contain and recovery plan where groundwater is found to be unacceptably contaminated by cyanide from the BGM residue disposal operations.*</p> <p>20b Implement the new contain and recovery plan prescribed in 20a.*</p>	Operation	WRC
Water Resource Protection (Quantity)	<ul style="list-style-type: none"> To ensure the impact of groundwater extraction on the environment in the vicinity of the BGM Project Area is minimised. To ensure that water supplies supporting human usage are not adversely affected by groundwater abstraction. 	<p>21a Design a monitoring program to determine the impact of dewatering operations on the three identified wetlands in consultation with CALM.*</p> <p>21b Implement the monitoring program prescribed in 21a.*</p> <p>22a Design a basement aquifer monitoring program to better characterise this aquifer in the vicinity of the BGM Project Area in consultation with the BGM Environmental Management Liaison Group.*</p> <p>22b Implement the basement aquifer monitoring program prescribed in 22a*</p> <p>23. Trial, and if effective continue, annual surveys of fringing vegetation on the Hotham River and Thirty-four Mile Brook in the vicinity of the BGM Project Area.</p> <p>24. Undertake studies to determine acceptable conditions for the release of excess water to Thirty-four Mile Brook.</p> <p>25. Participate in catchment management activities that are aimed at protecting or enhancing the ecological values of Hotham River and Thirty-four Mile Brook in the vicinity of the BGM Project Area.</p>	Operation	WRC

Topic	Environmental Objective	Action (*indicates modified or new commitment)	Phase	Advising agency
Residue Management	<ul style="list-style-type: none"> To design, construct and operate residue disposal areas and containment systems in a manner that minimises the discharge of potential contaminants to the environment. To maximise, as far as practicable, the recovery of decant water from residue disposal areas. 	<p>26. Continue to monitor the potential for pit disposal of residue in the BGM Project Area in consultation with the BGM Environmental Management Liaison Group.</p> <p>27. Submit design and supporting environmental documentation for an expansion of residue disposal capacity from 170 Mt to 310 Mt in the existing residue disposal areas to the State for review via the BGM Environmental Management Liaison Group.</p> <p>28. Install additional bores on the northern and western perimeter of the residue disposal areas in consultation with the Water and Rivers Commission and Department of Environmental Protection.</p>	Operation	BGMEMLG
Rehabilitation and Decommissioning	<ul style="list-style-type: none"> To ensure that rehabilitation prescriptions applied to disturbed areas on the BGM site result in a stable landform and a cover of vegetation which is compatible with the management of the adjacent State Forest. To develop and design an integrated rehabilitation plan which includes rehabilitation objectives, definition of completion criteria and continual progress towards agreed landform, final land use and vegetation characteristics. To use reasonable and practicable measures to reduce the out of pit placement of non mineralised rock. 	<p>29. Develop rehabilitation and decommissioning plans for the BGM Project Area in consultation with the BGM Environmental Management Liaison Group.</p> <p>30. Continue field trials for rehabilitation of residue disposal areas.</p> <p>31. Undertake a research and development program to identify alternative techniques for residue rehabilitation.</p> <p>32. Undertake detailed studies to determine management options for the lake(s) in consultation with the BGM Environmental Management Liaison Group.</p> <p>33. Undertake a comprehensive study to characterise the ecology and human dependencies on Thirty-four mile Brook in order to establish a baseline for evaluation of rehabilitation strategies.</p> <p>34. Develop water release and water quality targets for the decommissioned phase of the mine in consultation with the BGM Environmental Management Liaison Group.</p>	Operation Decommissioning	BGMEMLG
Greenhouse gas emissions	<ul style="list-style-type: none"> To ensure that “greenhouse gas” emissions from the project are adequately addressed and best available efficient technologies are used in Western Australia to minimise Western Australia’s “greenhouse gas” emissions. To mitigate “greenhouse gas” emissions in accordance with the Framework Convention on Climate Change 1992, and consistent with the National Greenhouse Strategy. To reduce as far as practicable the emission of greenhouse gases from the project site and to comply with EPA policy. 	<p>35a Prepare a greenhouse gas management plan that will include:</p> <p>calculation of the greenhouse gas emissions associated with the proposal, as indicated in “Minimising Greenhouse Gas Emissions, Guidance for the Assessment of Environmental Factors, No. 12” published by the Environmental Protection Authority;</p> <p>specific measures to minimise the total net “greenhouse gas” emissions and/or the “greenhouse gas” emissions per unit of product associated with the proposal;</p> <p>monitoring of “greenhouse gas” emissions;</p> <p>estimation of the “greenhouse gas” efficiency of the project (per unit of product and/or other agreed performance indicators) in comparison with the efficiencies of other comparable projects producing a similar product;</p> <p>analysis of the extent to which the proposal meets the</p>	Precommissioning Operation	BGMEMLG

Topic	Environmental Objective	Action (*indicates modified or new commitment)	Phase	Advising agency
		<p>requirements of the National Strategy using a combination of: “no regrets” measures; “beyond no regrets” measures; landuse change or forestry offsets; international flexibility mechanisms; and a target set by the proponent for the reduction of the total net “greenhouse gas” emissions and/or “greenhouse gas” emissions per unit of product over unit of product time, and annual reporting of progress made in achieving this target. *</p> <p>Note: In Dot point 5 above, the following definitions apply:</p> <p>(1) “no regrets” measures are those that can be implemented by a proponent which are effectively cost neutral and provide the proponent with returns and savings which offset the initial capital expenditure that may be incurred.</p> <p>(2) “beyond no regrets” measures are those that can be implemented by a proponent which involve some additional cost that is not expected to be recovered.</p> <p>35b Implement the Greenhouse Gas Management Plan prescribed in 35a.to the requirements of the Minister for Environment and Heritage on the advice of the Environmental Protection Authority*</p> <p>36. Prepare a scheme to assist revegetation of the Hotham catchment that includes sponsorship of: research, planting or revegetation trials on farming land; re-establishment of riparian vegetation in degraded areas; and enhancement of biodiversity in degraded areas.*</p> <p>37. Implement the vegetation scheme described in commitment 36.*</p>		
Other Environmental Factors				
Forest Disease Management	<ul style="list-style-type: none"> To minimise the risk of project activities introducing or spreading Jarrah Dieback disease in forest area in the BGM Project Area. 	<p>38. Continue to implement and regularly update the Forest Hygiene Policy throughout the project area.</p> <p>39. Investigate rehabilitation of forested areas affected by Jarrah Dieback.</p> <p>40. Support research which is relevant to forest disease management and BGM operations.</p> <p>41. Monitor the rate of spread and the extent of forest disease infections within the area covered by the BGM operations.</p>	Operation Decommissioning	CALM

Topic	Environmental Objective	Action (*indicates modified or new commitment)	Phase	Advising agency
Integration with State Forest management	<ul style="list-style-type: none"> To integrate, as far as practicable, with State Forest management. 	42. Continue to implement a fire control plan in consultation with CALM, Bunnings and the Shire of Boddington for the BGM Project Area. 43. Maximise salvage of forest products from clearing in BGM project area. 44. Participate in regional feral animal and weed control programs in association with CALM.	Operation Decommissioning	CALM
Noise and Blast Management	<ul style="list-style-type: none"> To comply with statutory noise requirements at the nearest noise sensitive premises. 	45. Investigate methods to reduce noise emissions in accordance with best practice. 46. Investigate complaints regarding noise and blast vibration and take corrective action where required. 47a Prepare a noise management plan .* 47b Implement a noise management plan prescribed in 47a.*	Precommissioning Operation	
Dust Management	<ul style="list-style-type: none"> To comply with statutory requirements. 	48. Monitor and investigate, as required, strategies for dust control.	Operation	
Air Emissions	<ul style="list-style-type: none"> To ensure the emission of gases complies with recognised standards for the protection of human health and the environment. To use all reasonable and practicable measures to reduce the discharge of waste, including gases. 	49. Minimise burning of forest debris.	Operation	BGMEMLG
Social Environmental Factors				
Community Consultation	<ul style="list-style-type: none"> To ensure the local community is adequately consulted regarding the proposed changes to the Boddington Gold Mine operation. 	50. Implement a community consultation program, which includes regular meetings on site with resident landowners in the vicinity of the Project Area.	Precommissioning Operation	N/A
Impacts on the Local Community	<ul style="list-style-type: none"> To reasonably assist the local community to manage social impacts arising from the construction and operational phases of the EBO proposal. 	51. Offer the option of accommodation in the BGM village to Boddington Expansion construction workforce. 52. Consult with the Shire of Boddington on matters related to the accommodation of the BGM workforce.	Precommissioning Operation	Shire of Boddington
Road Traffic	<ul style="list-style-type: none"> To reduce as far as practicable impacts of road traffic resulting from the EBO proposal 	53a Prepare a heavy traffic management plan.* 53b Implement the heavy traffic management plan prescribed in 53a.*	Precommissioning Operation	BGMEMLG Shires
Separation Distances	<ul style="list-style-type: none"> To encourage planning authorities to maintain appropriate separation distances between BGM operations and incompatible land uses. 	54. Provide advice on implications of planning proposals and schemes in the vicinity of the BGM operations to appropriate State and local government agencies.	Operation	DPI

Topic	Environmental Objective	Action (*indicates modified or new commitment)	Phase	Advising agency
Heritage	<ul style="list-style-type: none"> To comply with statutory requirements for heritage. 	<p>55. Conserve archaeological values of any sites of archaeological significance.</p> <p>56a Prepare an Aboriginal Heritage Management Plan that addresses:</p> <p>cultural and colonial history;</p> <p>confirmation of the location of existing archaeological sites;</p> <p>protection of existing sites;</p> <p>education of the workforce and contractors about the importance of sites;</p> <p>collection of materials where required;</p> <p>investigation of sites as appropriate; and</p> <p>management of sites discovered during construction.*</p> <p>56b Implement the Aboriginal Heritage Management Plan prescribed in 56a above.*</p>	Precommissioning Operation	DIA

*New or modified commitments

Abbreviations:

BGM	Boddington Gold Mine
EBO	Extended Basement Operation
CALM	Department of Conservation and Land Management
DEP	Department of Environmental Protection
WRC	Water and Rivers Commission
EPA	Environmental Protection Authority
#BGMEMLG	Boddington Gold Mine Environmental Management Liaison Group
DPI	Department of Planning and Infrastructure
DIA	Department of Indigenous Affairs

HEDGES GOLD
SHIRE OF BODDINGTON

Proposal: Decommissioning and closure of processing plant, the residue disposal area and associated infrastructure facilities at Hedges Gold approximately 12 kilometres north west of Boddington.

Proponent: Alcoa of Australia Ltd

Proponent Address: PO Box 252, Applecross WA 6153

Assessment Number: 1410

Previous EPA assessment numbers: 1057

Previous ministerial statement numbers: 20 published on 25 February 1988
450 published on 26 June 1997

Report of the Environmental Protection Authority: Bulletin 9XX

Previous Reports of the Environmental Protection Authority: 314 and 851

The proposal to which the above report of the Environmental Protection Authority relates may be implemented subject to the following environmental conditions and procedures:

Procedural Conditions

1 Implementation and Changes

- 1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions of this statement.
- 1-2 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is substantial, the proponent shall refer the matter to the Environmental Protection Authority.
- 1-3 Where the proponent seeks to change any aspect of the proposal as documented in schedule 1 of this statement in any way that the Minister for the Environment and Heritage determines, on advice of the Environmental Protection Authority, is not substantial, the proponent may implement those changes upon receipt of written advice.

2 Proponent Commitments

- 2-1 The proponent shall implement the consolidated environmental management commitments documented in schedule 2 of this statement.
- 2-2 The proponent shall implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of conditions in this statement.

3 Proponent Nomination and Contact Details

- 3-1 The proponent for the time being nominated by the Minister for the Environment and Heritage under section 38(6) or (7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal until such time as the Minister for the Environment and Heritage has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.
- 3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capacity of the proposed replacement proponent to carry out the proposal shall also be provided.
- 3-3 The nominated proponent shall notify the Department of Environmental Protection of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

4-1 The proponent shall provide evidence to the Minister for the Environment and Heritage within five years of the date of this statement that the proposal has been substantially commenced or the approval granted in this statement shall lapse and be void

Note: The Minister for the Environment and Heritage will determine any dispute as to whether the proposal has been substantially commenced.

4-2 The proponent shall make application for any extension of approval for the substantial commencement of the proposal beyond five years from the date of this statement to the Minister for Environment and Heritage, prior to the expiration of the five-year period referred to in condition 4-1.

The application shall demonstrate that:

the environmental factors of the proposal have not changed significantly,

new, significant, environmental issues have not arisen; and

all relevant government authorities have been consulted.

Note: The Minister for the Environment and Heritage may consider the grant of an extension of the time limit of approval not exceeding five-years for the substantial commencement of the proposal.

5 Minimum Flow Rate

5-1 The Water and Rivers Commission will review the minimum flow rate of 342 kilolitres per hour referred to in condition 14 after two winter flows and will advise the Environmental Protection Authority as to whether this rate is resulting in undesirable environmental impacts.

Environmental Conditions

6 Compliance Audit and Performance Review

6-1 The proponent shall prepare an audit program in consultation with and submit compliance reports to the Department of Environmental Protection which address:

the implementation of the proposal as defined in schedule 1 of this statement;

evidence of compliance with the conditions and commitments; and

the performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the *Environmental Protection Act 1986*, the Chief Executive Officer of the Department of Environmental Protection is empowered to audit the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans, conditions, procedures and commitments contained in this statement. Usually, the Department of Environmental Protection prepares an audit table which can be utilised by the proponent, if required, to prepare an audit program to ensure that the proposal is implemented as required. The Chief Executive Officer is responsible for the preparation of written advice to the proponent, which is signed off either the Minister or, under and endorsed condition clearance process, a delegate within the Environmental Protection Authority or the Department of Environmental Protection that the requirements have been met.

7 Jarrah Dieback

7-1 At all times, the proponent shall comply with hygiene measures for jarrah dieback disease to the requirements of the Minister for the Environment and Heritage on advice from the Environmental Protection Authority and the Department of Conservation and Land Management.

8 Biological Baseline Report

8-1 Prior to commissioning of the plant, the proponent shall prepare a biological baseline report to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

8-2 The proponent shall document and report to the Environmental Protection Authority any changes from the biological baseline, as determined by an on-going biological monitoring program, and any consequent changes to management.

9 Water Quality

9-1 The proponent shall not cause or allow surface water in which the weak acid dissociable (WAD) cyanide exceeds 50 µg/L to be discharged beyond the property boundary of the project.

10 Caustic Soda

10-1 The proponent shall only use low mercury caustic soda in which the mercury level does not exceed those limits set for use of caustic soda in the alumina industry in Western Australia.

11 Tailings Dam

11-1 Prior to construction of the tailings dam, the proponent shall design the tailings dam to include safety features, recovery systems and underdrain design, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority, the Department of Mineral and Petroleum Resources, and the Water and Rivers Commission.

11-2 The proponent shall construct the tailings dam according to the design required by condition 11-1.

12 Groundwater

12-1 Prior to commissioning of the tailings dam, the proponent shall prepare a groundwater monitoring program which includes:

- 1 measurements of dissolved salts, pH and cyanide;
- 2 monitoring results and notification to the Department of Environmental Protection of any detected seepage;
- 3 plans for remedial action, in the event that seepage is detected, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority

12-2 The proponent shall implement the groundwater monitoring program required by 12-1.

13 Hotham River

13-1 The proponent shall only pump water from the Hotham River when the river flow is in excess of 342 kilolitres per hour as measured at the Marradong River bridge gauging station.

13-2 When pumping from the Hotham River, the proponent shall not cause the remaining river flow to be reduced to below the level of 342 kilolitres per hour as measured at Marradong River bridge gauging station.

13-3 To ensure that overall pumping does not reduce flow below 342 kilolitres per hour, the proponent shall enter into legal agreements with other major users of water from the Hotham River, to the requirements of the Minister for Water Resources.

14 Salinity

14-1 Prior to commissioning the plant, the proponent shall prepare a program of hydrological studies to determine changes in the salinity of surface water and groundwater arising from mining operations to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

14-2 The proponent shall implement the hydrological studies program required by condition 14-1.

15 Noise

15-1 The proponent shall ensure that noise levels generated by blasting operations do not exceed 115 dB linear peak at noise-sensitive premises.

Note: acceptable levels from machinery will be set during Works Approval and licensing under the *Environmental Protection Act 1986*

16 Rehabilitation

16-1 Within twelve months following commissioning, the proponent shall prepare a rehabilitation program which addresses:

1. The rehabilitation of landscape, soils and vegetation appropriate for the land use priority for that area within State Forest and to standards appropriate to bauxite mining;
2. The rehabilitation of areas affected by chemical spills should they occur and monitoring of chemical concentrations until they decline to background levels;
3. The rehabilitation of haul roads in State Forest;
4. The rehabilitation of water supply dam;
5. The rehabilitation of the tailings dam,

to the requirements of the Minister for the Environment and Heritage, on advice of the Environmental Protection Authority, the Department of Conservation and Land Management, the Department of Mineral and Petroleum Resources; and the Water and rivers Commission, as appropriate.

16-2 The proponent shall implement the rehabilitation program required by condition 16.1.

17 Environmental Management Program

17-1 Prior to each separate construction or development stage being implemented, the proponent shall prepare an Environmental Management Program for that stage, to the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority.

Note: These stages shall be consolidated into a document suitable for public information and shall include information resulting from the requirements of conditions 7, 8, 9, 11, 12, 13, 14, and 16.

17-2 The proponent shall implement the various stages of the Environmental Management Program required by condition 17-1.

18 Environmental Management System

The proponent should exercise care and diligence in managing the proposal to ensure the protection to the environment.

18-1 In order to manage the relevant environmental factors and meet the environmental objectives in Environmental Protection Authority Bulletins 314 and 851 and fulfil the requirements of the conditions and procedures in this Statement, prior to the implementation of the proposal, the proponent shall prepare environmental management system documentation, including the environmental management program referred to in condition 18, in accordance with recognised environmental management principles, such as those in Australian Standards AS/NZA ISO 14000 series, in consultation with the Department of Environmental Protection.

18-2 The proponent shall implement the environmental management system referred to in condition 18.1.

19 Decommissioning

19-1 The proponent shall carry out the satisfactory decommissioning of the project, removal of the plant and installations and rehabilitation of the site and its environs.

19-2 At least twelve months prior to decommissioning, the proponent shall prepare a final decommissioning and rehabilitation plan to achieve the objectives of condition 19.1, to

the requirements of the Minister for the Environment and Heritage on advice of the Environmental Protection Authority, the Department of Conservation and Land Management, the Water and Rivers Commission and the Department of Mineral and Petroleum Resources.

This plan shall address:

1. the tailings dam;
2. the water supply dam; and
3. the removal of waste and equipment.

19-3 The proponent shall implement the plan required by condition 19-2.

Procedures

- 1 Where the condition states “ to the requirements of the Minister for Environment and Heritage on the advice of the Environmental Protection Authority”, the Chief Executive Officer of the Department of Environmental Protection will obtain that advice for the preparation of written advice to the proponent.
- 2 The Environmental Protection Authority may seek advice from other agencies, as required, in order to provide its advice to the Chief Executive Officer of the Department of Environmental Protection.

Note

- 1 The Minister for the Environment and Heritage will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environmental Protection over the fulfilment of the requirements of the conditions.
- 2 The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986*.
- 3 The Minister for the Environment and Heritage will request the Minister for State Development to consider how on-going review of environmental performance for Boddington and Hedges gold mines can be coordinated in respect of provisions relating to the projects under the Mining Act and relevant State Agreement Act.

Schedule 1

The Proposal

The proposal to which this statement relates is to the decommissioning and closure of facilities at Hedges Gold as specified in the key proposal characteristic table below.

Key Characteristics Table

Element	Characteristic
Decommissioning and closure	Processing Plant and associated infrastructure
	Administration area and associated infrastructure
	Tailings Water Treatment Plant
	River Water Dam
	Access and Haul Road
	Tailings Dam and associated infrastructure

Proponent's Environmental Management Commitments

1 October 2000

**HEDGES GOLD
SHIRE OF BODDINGTON (Assessment No. 1410)**

Alcoa of Australia Ltd

1. comply with the requirements of applicable Acts and Regulations;
2. minimise clearing of land consistent with safe and efficient operations;
3. compensate the State for all clearing of State Forest;
4. establish environmental regulations for both construction and permanent workforces; ensure that these regulations are complied with through environmental education, supervision and enforcement; take full responsibility for the environmental performance of both permanent employees and sub-contractors;
5. return affected areas to appropriate and achievable land uses in accordance with agreements with the State Government using prescriptions developed in consultation with relevant State Government authorities; and
6. monitor and maintain rehabilitated pits, waste stockpiles, haul road and residue disposal areas until such time as it is agreed, with the State, that the objectives of such rehabilitation have been met.
7. design and operate a water quality, drainage and stormwater management system throughout the project area which will minimise the discharge of turbid water, plant chemicals or tailings spills into nearby streams, and minimise erosion;
8. monitor stream flow for quality and quantity in 34 Mile Brook upstream and downstream of the tailings dam;
9. apply appropriate dieback management procedures to activities conducted in other forest areas; and
10. conduct forest upgrading planting in disease affected State Forest immediately adjacent to operations, if required and considered appropriate by CALM.
11. control fugitive dust from the project.
12. monitor faunal populations in the project area
13. restrict human and non-avian access to potentially hazardous areas by fencing. If necessary construct and place avifaunal deterrents in the tailings impoundment.
14. monitor noise levels in the project area and its surrounds; use Blast Acoustic Modelling procedure developed at Alcoa's bauxite mine sites to predict and reduce noise impact on Boddington town site and neighbours;
15. advise nearby populations and relevant Government officers of likely blasting times;
16. carry out detailed investigations and design of tailings impoundment in accordance with Government requirements. Minimise seepage from the tailings dam by provision of an underdrainage system, by selection of suitable low permeability materials for dam wall construction, and inclusion of seepage cutoff features in the design of the dam wall;
17. monitor surface water quality in streams immediately downstream of the tailings dam (and plant site) and the water supply dam. Monitor groundwater quality downstream of the tailings dam and implement a detailed monitoring, recovery and recycle treatment strategy if elevated pollutant levels are detected in seepage or groundwater.
18. in the event of contaminated groundwater being detected, be prepared to establish a recovery bore system downflow of the tailings area.
19. modify residue management system and operations to the reasonable satisfaction of the State if unexpected problems occur;
20. notify the Water Authority, EPA and downstream users promptly if any spillage occurs which has the potential to affect downstream water users; conduct clean-up or containment operations if necessary.
21. remove contaminated material and carry out appropriate rehabilitation if a tailings pipeline failure occurs.
22. establish surface water contouring and drainage to prevent the rise of contaminated water in residue areas during rehabilitation, and permit vegetation establishment. Establish a drainage collection system to retain runoff so that it can be monitored and if necessary treated prior to discharge.

23. continue monitoring the water residue system until it is decided, in consultation with the State, that such activity is no longer required.
24. carry out investigations in conjunction with WAJV, or independently, on residual process chemicals in the gold tailings and their possible effects on underlying soils and groundwater. Include a comprehensive survey after the first 12 months operation of the chemical status of the tailings deposit;
25. keep abreast of developments in gold tailings disposal technology for possible future application in treating contaminated seepage or runoff if it proves necessary
26. provide access for CALM and local Bush Fire Brigades.
27. submit an annual report of environmental management and monitoring programs, the content of which is to be determined by agreement with the State.
28. construct more positive cut off features or seepage collection systems for the trailing dam, if unacceptable seepage occurs.
29. design the initial tailings dam and its extensions to store runoff from a net year with a 1:1000 year frequency;
30. carry out or sponsor studies on the interactions between tailings leachate and foundation soils after the commencement of operations;
31. carefully monitored water quality changes prior to and following startup and if adverse trends develop then measures will be taken to protect downstream uses.
32. in the event that unacceptable water pollution occurs downstream, carry out remedial action to the satisfaction of the State.
33. commence a hydrological monitoring and assessment program prior to start-up and would update it continuously.
34. monitor the water and salt balance for the tailings circuit;
35. with regard to monitoring of water quality and quantity of 34 Mile Brook, co-ordinate monitoring with that of BGM and WAWA requirements;
36. ensure that domestic waste disposal within the 34 Mile Brook Catchment would use self contained toilets and enclosed garbage bins;
37. establish a correlation between the minimum flow at the Marradong Gauging Weir and the river level at pump suction. An automatic cutoff system would ensure that pumping ceases at this time.
38. transport chemicals according to standard government safety requirements;
39. provide access for fire control purposes.
40. take action to the reasonable satisfaction of the State if actual or potential risks, not adequately addressed in this ERMP, occur.

Appendix 4

Advice from the Boddington Gold Mine Liaison Group



Department of
Mineral and Petroleum Resources

Your ref:
Our ref: MC:RL 2431/99; 1241/00
Enquiries Mark Cannon 9222 3263

Mineral House
100 Plain Street East Perth
Western Australia 6004

Telephone +618 9222 3333
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www.mpr.wa.gov.au

The Chairman
Environmental Protection Authority
141 St Georges Terrace
PERTH WA 6000

Dear Sir

**BODDINGTON AND HEDGES GOLD MINE, BODDINGTON EXPANSION –
SECTION 46 REVIEW
GAS FIRED POWER STATION AND NATURAL GAS PIPELINE
ENVIRONMENTAL PROTECTION STATEMENT - SECTION 38**

I refer to the above stated document submitted as a draft by the Boddington Gold Mine and reviewed by the Boddington Gold Mine Liaison Group (BGMLG) over the course of the last twelve months and most recently at the meeting of 31 October 2001.

The expansion proposal considers changes to the approved Extended Basement Operations proposal. The BGMLG notes the following changes and predicted outcomes:

- Processing of up to 29 Mtpa of ore with a mine life of 20 years;
- Aboveground, in-valley and in-pit waste dumps. Wandoo North void will be backfilled in the second half of the mine life to remove the northern void. The potential for Acid Rock Drainage has been examined and addressed in the design. Potentially acid producing high capacity material will be backfilled into the void below the final water level or otherwise encapsulated in non-acid-forming material in specially designed waste rock dumps;
- Use of D1 dam only as a storm surge dam for the residue areas, resulting in substantially lower levels of cyanide in D1;
- Installation of a sulphidisation, acidification, recycling and thickening (SART) process to recover copper and cyanide from cyanide leach solutions which will effectively halve the levels of copper and weak acid dissociable cyanide reporting to the residue areas;
- Permanent diversion of Thirty-four Mile Brook around the in-valley waste dump. This will affect about 900m of the brook. The opportunity to bypass the D4 dam and restore the seasonal flows to the lower reaches of the brook is the proposed outcome along with restored habitat features.
- The Regional Forest Agreement changed the boundary of the Duncan Management Priority Forest Area (now part of Monadnocks National Park), such that the project no longer encroaches on the conservation area. However the proposal includes the exchange covered by BGM's leases, for land of comparable conservation values;

- A slightly smaller area of native vegetation will be cleared than under the EBO. Priority flora affected will be encouraged into rehabilitation areas. The land exchange proposed will more than compensate for loss of habitat;
- Some work has been undertaken on a conceptual decommissioning plan which includes a single lake in the final Wandoo South void. This work will be continued and a Preliminary Decommissioning Plan prepared by October 2002;
- A noise management plan will be prepared to ensure that noise levels will comply with the 1997 Environmental Protection (Noise) Regulations;
- A traffic management plan will be developed in consultation with relevant Shires to cater for the significant increases in traffic movements to and from the site;
- Installation of an on-site gas-fired power station (nominally 100MW capacity) with a gas lateral from Pinjarra is proposed as an alternative to sourcing power from the Western Power grid.
- The on-site gas-fired power station will substantially reduce greenhouse gas emissions to a maximum annual rate of 453,000 tonnes. This is about 328,000 and 500,000 tonnes less than the peak rates for the EBO and Western Power grid expansion options respectively;
- Risks and hazards associated with the gas pipeline in particular, will be assessed to achieve risks in the "low" or "negligible" category according to AS2885.1 (1997) and HB105 (1998). Management of this aspect will also be included in the Environmental Management System for the site.

The BGMLG considers that these proposals being discussed are environmentally acceptable. Furthermore, it also considers that the draft environmental conditions and commitments presented are adequate to manage the environmental impacts identified.

Yours faithfully



Mark Cannon
Chairman BGMLG

4 December, 2001

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